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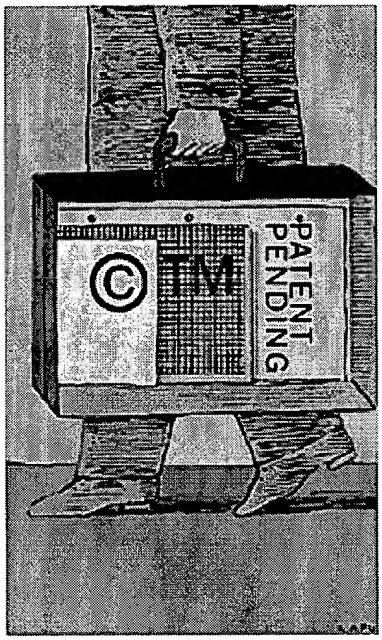
Monetizing Innovation: Analyzing and Leveraging Intellectual Property Portfolios

By Robert (Russ) O'Haver, Ph.D.

Dr. Russ O'Haver is a NERA vice president.



Many companies have developed large portfolios of patents and other forms of intellectual property (IP) but use only a small portion of these intangible assets in core products and services. The remaining assets effectively sit on the shelf. Although many idle IP assets have little value, others can provide economic benefits — for example, through third-party licensing deals in industries in which the patent owner does not compete. This article discusses ways corporations can create value from under-performing intellectual property and leverage further their core IP assets.

Businesses, particularly larger ones, often lack a systematic understanding of all of their patents (and unpatented technology), copyrights, and trademarks. This, in turn, means missed opportunities to generate greater economic returns from IP portfolios. For a relatively small incremental investment, companies can not only develop strategies for creating new revenue streams, but also use a deeper understanding of their IP portfolio to inform their:

- business strategy — e.g., how certain patent portfolios might constrain strategic moves into new business areas or facilitate opportunities for partnering;
- research and development — e.g., identifying technology areas for investment or in-licensing from other industries;
- legal protection of intangible assets — e.g., assessing the relative market benefits of patenting trade secret protection; and
- tax planning — e.g., donating patents that no longer fit with core strategies to universities or other nonprofit organizations.

Screening the Portfolio

For a company with thousands of patents, various analytical filters can be passed through the IP portfolio to help screen systematically patents that may have untapped commercial potential. Over the past five years, software tools for i° patent mappingi± have been developed that enable companies to identify the patents in a particular technology space, the characteristics of those patents, and their relation to one another. These tools can serve as some of the early-stage, less labor-intensive filters for a portfolio.

One patent-mapping technique is analyzing the groups of patents that form technology clusters. Quite often a company has a few core patents, with a number of patents around that core to protect the perimeter from competitors. Clustering patents into technology groups is a useful first step to reducing the size of the analysis to a manageable level, to understanding a company's core technology strengths and its related protection strategies, and to identifying the breadth of coverage across a technology space.

Another software-driven patent-mapping technique is citation analysis. The process of securing a patent from the U.S. Patent and Trademark Office requires references to the so-called "prior art" — i.e., other patents and published research related to the proposed innovation. After receiving a patent, subsequent applications will, in turn, reference the earlier one.

Thus, for any individual patent, there are sets of backward and forward references (or citations) that resemble a family tree, with direct descendants, cousins, and other relations.

These relationships can provide important insights. For example, a company in a completely different industry may be citing your patent, which could suggest an opportunity for licensing or another form of

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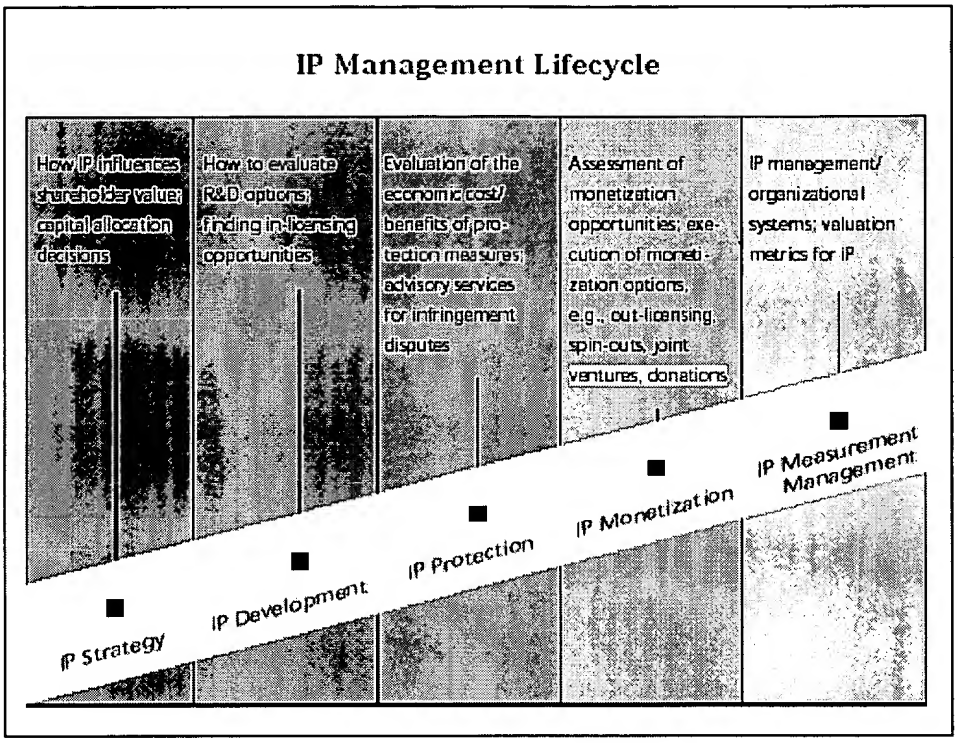
partnering. Companies typically focus on their own industries and often lack a broad view of technology transfer opportunities from other industries. Yet innovations developed in one industry may have a crossover application in another. A good example is KEVLAR®, a strong, lightweight material originally developed for tire treads that has found significant commercial application in such areas as body armor and high-performance sails. As more industries converge – for example, pharma and chemicals, and bio tech and computing – opportunities for such technology transfer will increase.



The patent-mapping tools described above and similar techniques have applications beyond identifying opportunities to monetize an IP portfolio. For example, patent mapping is a valuable tool for research ar development. What technologies have been developed? Who has developed them? What are the open spaces? Should we spend our own R&D dollars to develop a new technology, or would we be better off i licensing it?

A longitudinal analysis of a technology space can provide insights into the length of technology cycles ar topics related to patent value. A great deal of patenting may be followed by a lull, then a large increase activity. Understanding the timing of innovation is important to R&D, valuation, and strategic planning. Citation analysis is also beginning to be used for patent valuation purposes, and economic research pap suggest that higher degrees of citation and other patent metrics correlate to greater patent value.

Patent mapping is only one screening tool. Other techniques to understand what is in the IP portfolio an what more could be done with it include financial and market analysis, bargaining scenarios for potentia licensing opportunities, and legal and technology assessments from qualified experts, particularly aroun patent claim sets.

Monetization Options

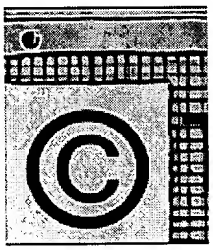
A rigorous analysis of a patent portfolio typically reveals a subset of patents that may be good candidate for licensing. There are two basic types of licensing. The first, "stick" licensing, is an opportunity that arises when another company may be infringing on your patents. One option is to negotiate a royalty payment for the continued use of your innovation in their product. This is a particularly complex type of licensing, which generally requires a good understanding of the litigation environment and the costs and benefits of proceeding down that path.

"Carrot" licensing is when a company has developed an IP asset that may have value in another industr For example, communications companies have developed powerful patternrecognition software to detec anomalous transactions. They can license this software to other industries where transactional fraud rat are high or under increasing scrutiny – for example, depository institutions where new national security regulations have increased monitoring requirements. As with the KEVLAR® example, a ceramic develop for the aerospace industry could have attributes that would also be desirable in a variety of basic industi processes. Similar licensing strategies can be used with brands. MasterCard®, for example, extended its brand to bank-issued debit cards and stored-value transactional cards.

One option for monetizing technology-related IP is a spin-out, or business sale, in which a cluster of intangible assets and associated key people become the basis for creating a new and separate company. This may be an attractive option when a business has technologies and associated brands that do not fit with the core strategic direction of the company. One of the many important factors in a successful spin-out is the linkage between the patents and brand. Companies should be able to carve out pieces of the portfolio without disrupting other patents and brands. A related monetization option is a joint venture or other partnering opportunity that is based on the leverage potential of the technology or brand portfolios.

Companies can also donate their patents to universities and research institutions. This provides a tax deduction equivalent to the fair market value of the patent and can enhance the business's reputation fc corporate citizenship. DuPont, Proctor & Gamble, and other large companies have publicly acknowledgec programs for donating patents that no longer fit their strategic plans but may have commercial potentia with further development. The philanthropic goal of such programs is providing new revenue streams to universities and nonprofit organizations.

The business goal of patent donation is helping a company manage its federal tax liability. The location (intangible assets and so-called IP holding companies also has implications for state and local taxes, and therefore relevant to understanding the relative values of IP. Moreover, in international tax planning, th(location of intangibles for a large company with overseas subsidiaries is an important consideration. The transfer price – the price related companies will pay to use intangibles – must be justified at "arm's length."



Cost reduction is another form of monetizing a company's intellectual property. A thorough analysis of an IP portfolio will often reveal patents that are basically worthless because of advances in technology. Because formal patent protection is costly – typical lifetime costs for patents filed globally are $200,000 – abandoning a useless patent can generate signifi- cant cost savings. IBM, which is well known for its success in generating revenue from its IP portfolio, also does an excellent job of trimming the deadwood from its portfolio, even as it continues to be a leader in generating new patents.

Companies can take a similar approach to managing their trademarks, which are also expensive to maintain. A corporation that suspects it has too many brands may do a cost-benefit analysis of delisting some of their registered trademarks. New approaches to brand valuation facilitate such analyses. (See "The Ultimate Intangible," p. 19)

In some cases, when an IP asset appears interesting but has no immediate commercial use, a company may simply hold on to it. Similar to a call option in financial markets, this approach acknowledges that some markets can change quickly, and an opportunity to commercialize the asset could appear in the ne future.

Related IP Financial Products

Some companies are taking a hard look at securitizing their IP in the capital markets. If licensing activit accelerates, as many practitioners predict, companies may increasingly benefit from opportunities to securitize royalty streams as an alternative source of capital. Perhaps the best known examples of IP securitization have occurred in the music industry, where the royalty streams from copyrights owned by well-established artists have been fairly stable. Such securities have attractive risk-return characteristic: for investors.

The securitization of the royalty stream from an individual patent is a different matter altogether. There more idiosyncratic risk with a patent's royalty stream, and technological obsolescence could abruptly reduce its economic life. One of first patent-securitization deals involved Yale University, which licensed molecule it had developed to Bristol-Myers. The securitized royalty stream was "sold" in the capital markets for $115 million, and Yale used a portion of the proceeds to build a new research lab. U.S. universities reportedly generate more than $700 million in royalties annually and execute 3,300 licenses per year.

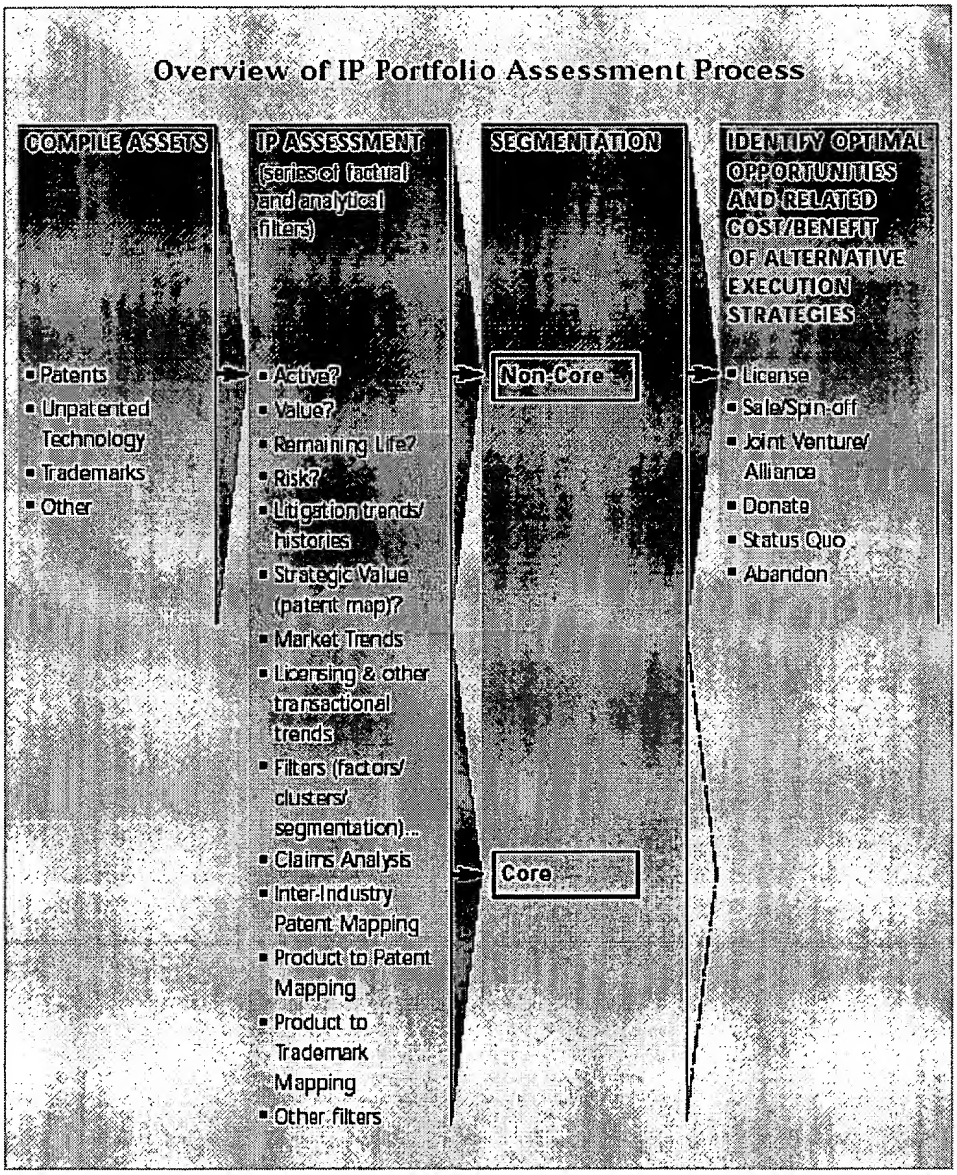
Licensing streams from a portfolio of patents present an opportunity for packaging the risks in a fashion similar to mortgage-backed securities. In such a package, pooling of diverse income streams reduces ris and creates a more marketable security.

Other forms of innovative IP financial instruments are also becoming available. These include using IP insurance products and related risk analysis (see "Gray Matters," p. 1), IP to collateralize third-party lending, and acquisition of IP rights from distressed companies.

Further Implications of Monetization

Monetizing IP helps create flexibility for a company's R&D function as a complement to cross-licensing a similar transactions that facilitate freedom to operate in a patented space. Instead of the traditional cho of developing a technology for products or abandoning it, a monetization strategy creates other opportunities for value creation.

This may be particularly important for industries such as pharmaceuticals, where it may not be possible continue the R&D process for every promising compound in earlystage development.



Monetization of IP can also have implications for mergers and acquisitions. For example, if a company b 100 patents or acquires a company with 100 patents, there may be ten that are considered particularly synergistic and may have motivated the transactions. But what about the other 90? Monetization analys can help executives decide whether product development, licensing, or donation is the best option.

As more companies begin to analyze their intellectual property and options for monetizing it, there is growing recognition that IP management must be approached proactively and holistically – i.e., spannin functions within corporations. With increasing international protection of IP rights through the TRIP acco and other multilateral agreements, there will likely be more incentives for licensing and monetization in general. As the reporting of IP assets becomes a more salient feature of discussions to enhance disclosu and the quality of financial statements, there will be greater emphasis on identifying and valuing intellectual property. Addressing this need will require more sophisticated tools and methodologies.

Dr. O'Haver, who is based in White Plains, advises clients on intellectual property matters, including monetization of patent and software portfolios, development of licensing positions, valuation of patents, brands, and copyrights, and royalty determination. NERA is a leading global economic consulting firm th applies economics and finance to solving complex business, risk management, and valuation issues. Dr. O'Haver can be reached at russ.ohaver@nera.com or at 212 345 6390.

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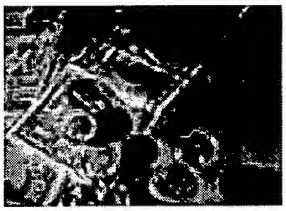

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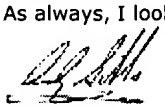

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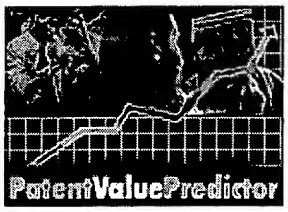

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A Macro-Economic Model Providing Patent Based Company Financial Indicators and Automated Patent Valuations [1]

I. Introduction

There is a growing interest in valuing patents and company patent portfolios because our economy is shifting from a tangible assets based economy to an intangible assets based economy [2], and capital allocation is based upon asset value. The business world has recognized that the intangible assets of many companies exceed the value of their tangible assets [3], and that patents are a substantial part of these intangible assets [4]. Despite the recognized value of patents, no generally applicable method has existed to value them, except for a labor and fact intensive micro economic analysis.

I developed a macro economic model for automatically valuing patents, which is presented elsewhere [5]. In this paper, I present some individual automated patent valuations and company-wide automated patent portfolio valuations resulting from the model (sections II and III), summarize the model (section IV), correlate results from the model for company-wide patent portfolios to market capitalizations of publicly traded companies and explain why those correlations show that certain basic assumptions of the model are valid (sections V and VI), discuss validating the model's individual automated patent valuations (section VII), and draw certain conclusions (section VIII).

II. Individual Automated Patent Valuations

I have implemented the macro economic model for automatically valuing patents in a programmed computer system, and I have used that system to automatically generate valuations for all enforceable non-expired U.S. patents. For example, valuations as of 1/1/01 provided by the macro economic model for ten patents appear in the following chart.

PN	TTL	ISD	ExpDate	ENF	Assignee	CFGDP	PVal
5289345	Opto-electronic device housing having self-healing elastomeric board mount with support pylonsele	2/22/94	2/22/11	0	BT&D Technologies Ltd.	$1,268,262.87	$0.00
5289346	Peripheral to area adapter with protective bumper for an integrated circuit chip	2/22/94	2/22/11	-1	Microelectronics and Computer Technology Corporation	$2,228,650.95	$936,054.36
5289347	Enclosure for electronic modules	2/22/94	2/22/11	-1	Digital Equipment Corporation	$329,975.23	$138,592.70
5289348	Shock absorbing rack system	2/22/94	2/22/11	0	Harold R. Miller	$6,010,280.95	$0.00
5289349	Integrated circuit card	2/22/94	2/22/11	-1	Sony Corporation	$2,846,105.01	$1,195,390.87
5289350	Pivotable	2/22/94	2/22/11	-1	Sachtler AG	$656,042.26	$275,543.92

	holding mechanism for an optical element				Kommunikat ionstechnik		
5289351	Backlighting device	2/22/94	2/22/11	-1	Tosoh Corporation	$1,270,251.38	$533,517.53
5289352	Headlamp for motor vehicles	2/22/94	2/22/11	0	Robert Bosch GmbH	$2,542,918.84	$0.00
5289353	Device for nondetachably mounting a supplemental high mounted stop lamp or the like to a windowpane	2/22/94	2/22/11	0	Nippon Sheet Glass Co., Ltd.|Koito Manufacturing Co.	$5,831,871.28	$2,449,440.79
5289354	Method for acoustic transmission of drilling data from a well	2/22/94	2/22/11	-1	Societe Nationale Elf Aquitaine (Production)	$703,709.55	$295,564.63

Automated patent valuations for all United States patents based upon the model are now available online at www.PatentValuePredictor.com.

At least one patent valuation purchased from the www.PatentValuePredictor.com service has been used as evidence of patent value in litigation [6]. In that case, the party relying upon the automated patent valuation did not have access to the patent assignee's financial data, and therefore did not have micro economic data necessary to independently evaluate the subject patent. Hence, the automated patent valuation was the best evidence available to them. There is a certain parallel to facts in that case and facts underlying many investment decisions. People who do not have access to a company's detailed financial data and licensing agreements relating to IP often make investment decisions regarding the company. In that type of situation, any reasonable quantitative number that can be placed on the value of the company's patent rights is useful.

III. Company Patent Portfolio Valuations

I have now implemented a database query that generates a company-wide patent data and valuation report. As an example, a report on "Exxon" (which report includes all assignees having their name starting with "Exxon") indicates that, as of May 08, 2001, companies whose names start with the word Exxon owned 2424 enforceable unexpired United States patents, that those patents had a total value of $7.076 billion, and that the annual sales of the markets protected by those patents (CFGDP) was $18.317 billion.

The report on "Exxon" is based upon assignee at issue data. Exxon Corporation and Mobil Corporation recently merged. Therefore, the report does not include patents assigned at issue to Mobil. A report generated based upon querying the database for "Exxon" or "Mobil" would include all patents naming either entity as the assignee. Presumably, preexisting patents owned by both entities have now been re-assigned after issue to the new entity "Exxon Mobil Corporation." The database from which I generated the report should be updated by September 2001 to include this assignee after issue data to handle these complications.

Company patent portfolio valuations based upon the model are now available at www.PatentValuePredictor.com. Automated company patent portfolio valuations as well as reports containing the type of information shown in the figures in this article may be available in the next few months.

IV. Summary of the Macro Economic Model For Patent Valuation

The macro economic model has two components. First, the model includes a measure of the relative value provided by each patent. Second, the model includes a relationship between macro economic data that links the measure of the relative value provided by each patent to dollar values.

In the first step, the model defines the relative value of each patent based upon measures of properties of the patent indicative of value. The model defines the quantity RPN to be the relative measure of the value of the patent. RPN is a function of measures of properties of the patent that, from a patent attorney's perspective, indicate breadth of coverage, value of the subject matter covered, and likelihood of validity. Those properties include, for

example, the lengths, type, and number of claims, the length of the disclosure, the field of technology, and the thoroughness of prosecution.

In the second step, the model relates the relative values of each patent to macro economic data to define quantitative valuations. The model assumes (1) that a certain fraction of GDP is for sales covered by all enforceable patents and (2) that the Covered Fraction of GDP covered by each patent (herein "CFGDP") is directly proportional to the RPN [7] for that patent. Those assumptions provide an equation with one unknown, which is the proportionality constant between the CFGDP and the RPN. Solution of that equation (which requires calculating the RPN for all patents) results in a value for CFGDP for each patent. The CFGDP is a nominal measure of sales protected by the patent. It is a nominal measure in the sense that it uses macro economic data (a fraction of GDP) in place of actual data for sales of products covered by the patent [8]. The substitution of CFGDP for actual sales data enables valuing a patent by applying income theory [9] to the patent's CFGDP and making certain simplifying assumptions [10].

V. Validating the Results of the Macro Economic Model Against Other Measures of Patent Value

There is no readily available source of individual patent valuation data against which to compare the automated individual patent valuations provided by the model. There is also no readily available source of company patent portfolio value data. However one readily available substitute for company patent portfolio value data is the dollar values of market capitalizations of publicly traded companies. Moreover, if there is a correlation between individual automated patent valuations and the actual value of individual patents, then the correlation should increase as the number of patents involved in valuations increases [11]. Publicly traded companies usually own relatively large numbers of patents. Therefore, publicly traded companies are a good place to look for even a small correlation between the model's automated patent valuations and the real world value.

Of course, the market capitalization of a company represents a number of value factors. Therefore, I expect (1) that the fraction of any company's market capitalization residing in patent value and (2) that the correlation of the model's predicted patent portfolio value to market capitalization should vary from company to company, from industry to industry, and from time to time. Despite these anticipated correlation reducing factors, the charts I present in the figures below demonstrate a striking correlation between the trends in CFGDP of company patent portfolios and company market capitalization, across several industries, over various sizes of market capitalization, and over a ten year period.

I chose to compare market capitalization to a company's CFGDP instead of the company's patent portfolio valuation because CFGDP is a more direct measure of the immediate financial impact of patent protection than a calculated patent valuation. This is because CFGDP does not depend upon (1) the remaining period of enforceability of the patent, (2) the profit margin associated with sales covered by the patent, or (3) the Internal Rate of Return [12], whereas patent value determined using income flow theory does depend upon variables (1) - (3).

My results shown in the figures below indicate that the sum of the CFGDP for the portfolio of patents owned by a publicly traded company is an accurate measure of the breadth of the company's patent protection. Specifically, the figures show that, over a ten year period, the trend in the sum of CFGDP for each company's patent portfolio correlates to the trend in that company's market capitalization. More simply put, CFGDP and market capitalization "track." This correlation implies that the value of each company's patent protection, as measured by the model, is a significant enough factor to the company's total value that variations over time in the company's patent protection are reflected in variations over time in the company's market capitalization. This in turn implies that the CFGDP for the companies patent portfolio is correlated to the actual magnitude of the protection afforded by the underlying patent portfolio.

These results indicate that the sum of the CFGDP and RPN values for a company's patent portfolio provide useful quantitative indicators for business analysis [13]. For example, the sum of the CFGDPs or RPNs for the patent portfolios of competing companies can be compared to one another to determine which company has the stronger patent protection. In addition, the time dependence of a company's existing patent portfolio can be extrapolated into the future to see when significant drop offs in value will occur. Since the model does not require actual sales data, no company specific proprietary sales information is required to perform these types of analysis.

VI. Comparing CFGDP to Company Market Capitalization

A. Explanation of Data

The type of data displayed in figure 4 is representative of the data displayed in figures 1-20. Figure 4 shows dollar amount in millions (y axis) versus time in years (x axis) for a company having a market capitalization in the middle of the range of market capitalization [14] of companies discussed herein.

Figure 4 shows dollar amounts for market capitalization of American Home Products

(diamond data points) and the sum of the CFGDP for all patents in the patent portfolio of American Home Products (square data points) over the ten year period 1/1/90 to 12/31/00. In addition, figure 4 shows the CFGDP in an expanded scale (triangle data points) for easy comparison of the trend in CFGDP to the trend in the market capitalization.

The CFGDP data shown in each figure represents the sum of CFGDP for all patents having assignee-at-issue names associated with the subject company, certain subsidiaries of the subject company, and predecessors in interest to the subject company [15]. Each CFGDP data point represents the sum of CFGDP for all patents assigned at issue to the subject company that were in force on January 01 of that year. Variation over time in the CFGDP shown in each figure is based upon issuance of new patents, expiration of old patents, and variation of GDP over time.

The data shown in figure 21 is representative of the data shown in figures 21-23. Figure 21 shows the ratio of CFGDP to market capitalization on the y axis plotted against company market capitalization (in millions of dollars) on the x axis for values on 12/31/00. Figure 21 includes data for the eight medical technology companies shown in figures 1-8. Figure 22 includes data for the computer and electronics companies shown in figures 9-14. Figure 23 includes data for the heavy industry companies shown in figures 15-20.

B. Discussion of Figures

1. Medical Technology Companies

Figures 1-8 show data for companies involved in medical technology. Figures 1-8 show data for companies in order of descending market capitalization as of 12/31/00. These figures illustrate several trends.

First, in figures 1-8, observe that the ratio of the scaled CFGDP (triangle data points) to the market capitalization shows that the trend in CFGDP and the trend in market capitalization for each company have a significant correlation. This initial fundamental observation suggests (1) that the value associated with the scope of patent protection is a significant portion of these companies' value and (2) that the CFGDP is a significant relative measure of a company's patent protection. As a corollary, the RPN should also be a significant measure of a company's patent protection since variations in RPN only differ from variations in CFGDP by the time dependence of GDP.

Second, in figures 1-8, observe that the absolute value of the CFGDP is always much less than the market capitalization. Applying income flow theory to CFGDPs in this technology based upon the United States national average profit margin of eight percent results in company patent portfolio valuations that are only a small fraction (between one and ten percent) of the market capitalizations (with the exception of Chiron). However, the degree of correlation between the trend in the CFGDP and the market capitalization indicates that patent protected sales account for a substantial fraction of company profits in this industry, and the small fraction result is inconsistent with that indication. Possible explanations of this inconsistency include (1) the possibility that the model undervalues CFGDP for patents in the medical technology field, (2) the fact that the profit margin in this industry is actually much larger than the United States national average profit margin, and (3) the fact that the currently implemented model does not account for the company's patent value attributable to non United States patents.

Third, in figures 1-8, observe that, for the largest companies, the market capitalization shows faster growth than does CFGDP. Both quantities trend upwards, but market capitalization trends upward at an increasing rate relative to the CFGDP. For example, in figure 1, which shows data for Pfizer, note that the rate of increase in market capitalization increases more rapidly than the rate of increase in CFGDP in years 1996-2000. The difference between the rate of increase in market capitalization and the rate of increase in CFGDP almost monotonically decreases with decreasing market capitalization (note the triangle and diamond data points sequencing from figure 1 to figure 8) and reverses sign for the smallest capitalization companies, Biogen and Chiron (Figures 7 and 8). As a consequence, the ratio of CFGDP to market capitalization as of 12/31/00 for the largest companies is relatively small, less than 0.1 for Pfizer, and that ratio increases almost monotonically with decreasing market capitalization to about 0.9 for Chiron.

These trends are reflected by figure 21. Figure 21 shows that the largest companies have the smallest ratios of CFGDP to market capitalization as of 12/31/00.

Fourth, note that, over the course of their corporate lives through 12/31/00, Biogen had acquired about 90 patents, and Amgen about 260 patents. The fact that the CFGDP and market capitalizations of each of these two companies correlate to one another indicates that the macro economic model provide statistically significant results even when the company patent portfolio is relatively small. On the other hand, the patent portfolios of these companies are so large from a conventional business due diligence valuation perspective that it would be prohibitively expensive to individually evaluate every patent. Moreover, a single blockbuster patent may have significant financial effect on a company of this size. Thus, for small capitalization companies, the macro economic model's automated patent valuations can be used to provide both a concrete valuation and a predictor of future corporate performance.

2. Semiconductor Electronics and Computers

Figures 9-14 show data for companies involved in semiconductor electronics and computer technology in order of decreasing market capitalization. These figures illustrate several trends.

First, in figures 9-14, observe that the trend in CFGDP is highly correlated to the trend in market capitalization (compare triangle to diamond data points in each chart). This observation is identical to the observation drawn for medical technology companies, and it supports the conclusion that CFGDP is a reasonable predictor of patent value.

Second, in figures 9-14, observe that the ratio of CFGDP to market capitalization increases as market capitalization decreases, just like with the medical technology companies. This trend is shown by the data points in figure 22 for the companies in this industry. Also note (1) that the CFGDP of Advanced Micro Devices as shown in figure 14 actually exceeded its market capitalization on 12/31/00 and (2) that as I write this article in June of 2001 the Advanced Micro Devices share price has roughly doubled since 12/31/00. While anecdotal in nature, this observation suggests that unusually large CFGDP to market capitalization values anticipate an increase in stock price.

3.Heavy Industries

Figures 15-20 show data for various heavy manufacturing industries (Exxon in integrated petroleum, Ford, GM, and Johnson Controls in automotive, Honeywell in aerospace and automated controls, Bethlehem Steel in steel). Figure 23 shows the trend in ratio of CFGDP to market capitalization versus market capitalization for the companies shown in Figures 15-20.

I would intuitively expect patents to have little effect in the automotive industry. Surprisingly, the trends in CFGDP for Ford (figure 16) and GM (figure 17) each correlate to the trends in their respective market capitalization. The values for CFGDP for Ford and GM are only a few percent of their market capitalizations. The only company in this set with apparently no patent protection was Johnson Controls (figure 19). Note that the stock price of Johnson Controls had been increasing over the last several years despite a continuous drop in its CFGDP. However, that observation is deceptive, since Johnson Control received 26 United States in the first six months of 2001. That equates to about one sixth of all patents Johnson Controls obtained since 1976, and it provides an increase in Johnson Control's CFGDP of roughly $100 million. Thus, the CFGDP of Johnson Controls is currently greater that it was at any time during the 1990-2000 time period. In the case of Johnson Controls, it appears that market capitalization anticipated patent portfolio value.

Exxon-Mobil (figure 15) also has a CFGDP that is a few percent of its market capitalization. I had considered petroleum refining and production strictly a commodity industry in which there was little innovation, but the data proves me wrong.

C. How Does Patent Value Relate to Market Capitalization?

Figures 21-23 show that the ratio of CFGDP to market capitalization decreases as the market capitalization of companies increase, but it also shows that the CFGDP of an individual company usually correlates to the market capitalization of that company. These observations raise an important financial analysis consideration. Do changes in patent portfolio value for a company anticipate changes in the company's market capitalization? The correlation of CFGDP to individual companies would indicate that the answer is yes. The fact that the largest companies grew to become the largest companies while their CFGDP/market capitalization ratios decreased with time muddies the waters.

If changes in patent value do anticipate changes in market capitalization then the large market capitalization companies would appear to be overvalued and the small market capitalization companies would appear to be undervalued, if evaluated based solely upon their predicted patent value. However, other conclusions are possible and likely. For example, the smaller capitalization companies may have more patents that do not cover valuable products, i.e., the patent portfolios of the small capitalization companies may be poorly managed. Another obvious possibility is that significant value in the large capitalization companies resides outside of United States patents, such as in contracts, goodwill, and foreign patents. An indication that this possibility is likely comes from Hoovers' business profile of the behemoth company Pfizer, which concludes with the statement that "The firm is known for its massive sales force and marketing strength." Another possibility is that the behemoth companies may own in part or in whole a substantial number of subsidiaries whose patent portfolios did not show up in my data as associated with the behemoth companies [16].

In summary, I believe that the trend in CFGDP shown in figures 1-20 reflects the trend in the contribution of patent value to market capitalization, even though there are of course other real world factors at play. In any case, certain financial conclusions can be drawn solely from the patent data. For example, I conclude that, as of 12/31/00, the financial markets undervalued Chiron.

VII. The Effect of Blockbuster Patents on a Company's Future Financial Performance

The foregoing results show a correlation between the macro economic model's CFGDP measure of patent portfolios and the capitalization of relatively large capitalization companies on a company by company basis. They do not show the effect of a single patent on company performance since a single patent, even a very valuable patent, is usually of little significance to a very large capitalization company. However, an effect associated with the issuance of a very valuable patent may be inferred from changes in market capitalization occurring over a relatively long period of time surrounding the issuance of

the patent. That time period would depend upon when products underlying the patent claims were developed and available, upon time for the market for those products to mature, and upon when the financial community recognized the value of the patent. Unfortunately, a myriad of other dependent factors exist, including issuance and expiration of other patents owned by the same company, changing market conditions, and advances by competitors. Thus, a mathematical analysis to show the correlation between what are predicted by the model to be blockbuster patents is not currently feasible. However, the www.PatentValuePredictor.com web site does offer a service that identifies and values the most valuable (as determined by the model) patents issued each week and provides a ratio of the patent value or CFGDP for that patent to the company's market capitalization when market capitalization data is available.

I am contacting certain companies owning what appear from the macro economic model to be blockbuster patents to obtain from them what anecdotal evidence they are willing to provide regarding the value of those patents. If any of you represent a company that owns a blockbuster patent and you are willing to provide patent valuation information regarding the patent to me on a non-confidential basis, I would be pleased to speak with you.

VIII. Conclusions

I show that patent based financial indicators derived from the macro economic model provide a statistically significant correlation to company market capitalization, thus showing that the basic premises of the model relating to relative valuation of patents has statistical significance. This implies that the model's assumption that the measures of certain properties of the patent document are indicators of relative patent value is correct.

The qualitative results obtained by comparing the sum of a company's CFGDP to the company's total market capitalization for twenty companies, when considering the fact that many other factors add to market capitalization, indicate that automated patent valuations derived from the model are, on average, "within the ballpark" of what one would expect to be the contribution of patent portfolio value to total company value. However, the valuations could be refined to account for industry specific effects, for example, by adding in industry dependence to CFGDP or profit margin. Since a strong correlation exists between patent value and market capitalization, a least squares analysis could be performed on the patent valuation algorithm to maximize the correlation between CFGDP trend and market capitalization over a large number of companies. That analysis would result in the best fit for the coefficients of the patent measurement functions defining the RPN.

The results show that smaller companies have a relatively larger ratio of patent value to market capitalization than larger companies. This suggests that more of the value of smaller companies resides in the protective value of their patent portfolios. The results show that the relatively small number of patents owned by a small company are sufficient to provide a patent based predictor (e.g., CFGDP) of value that tracks the company's market capitalization. As a corollary, the model's valuations appear to be particularly useful for financial analysis of small capitalization companies. Specifically, the model's valuations may be used to identify individual blockbuster patents that should have a significant financial impact on small capitalization companies, as indicated by the ratio of the CFGDP of the individual patent to the market capitalization of the company.

Finally, there is no other readily available source of individual patent values. For quick and inexpensive patent valuations the macro economic model is the only game in town.

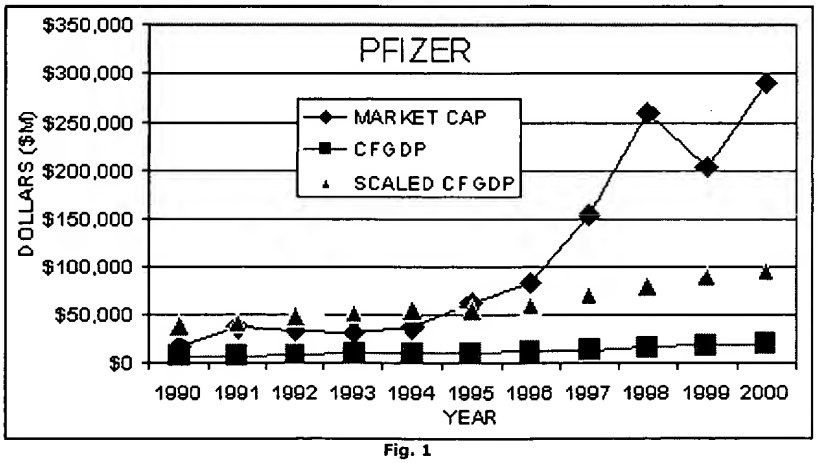

Fig. 1

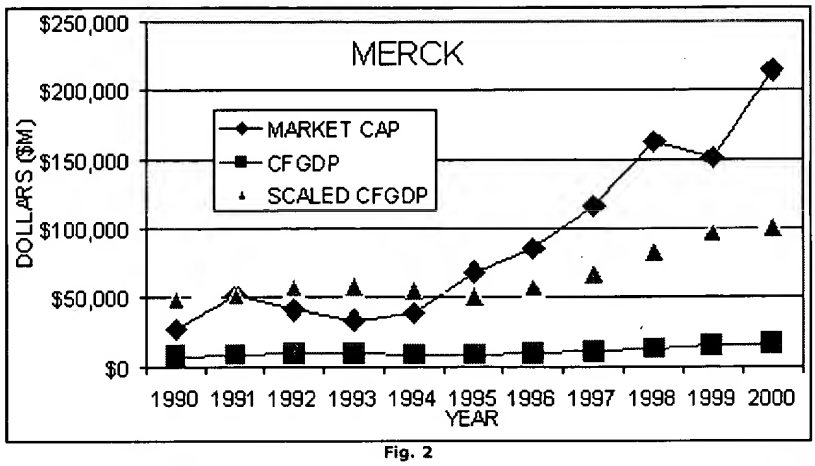

Fig. 2

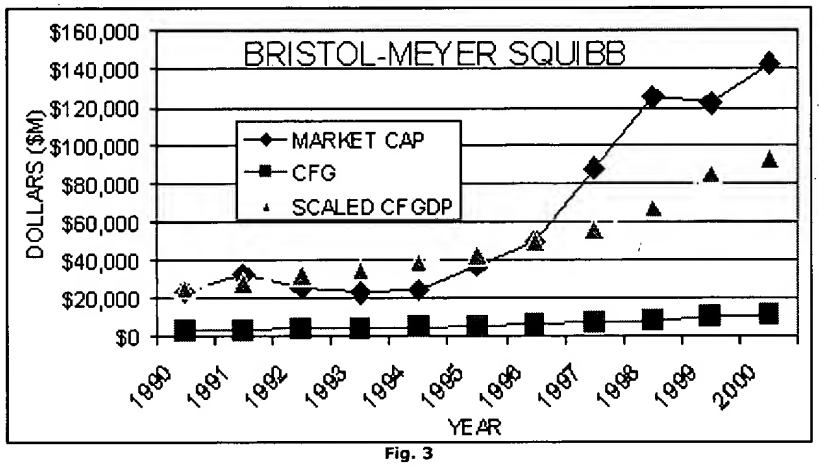

Fig. 3

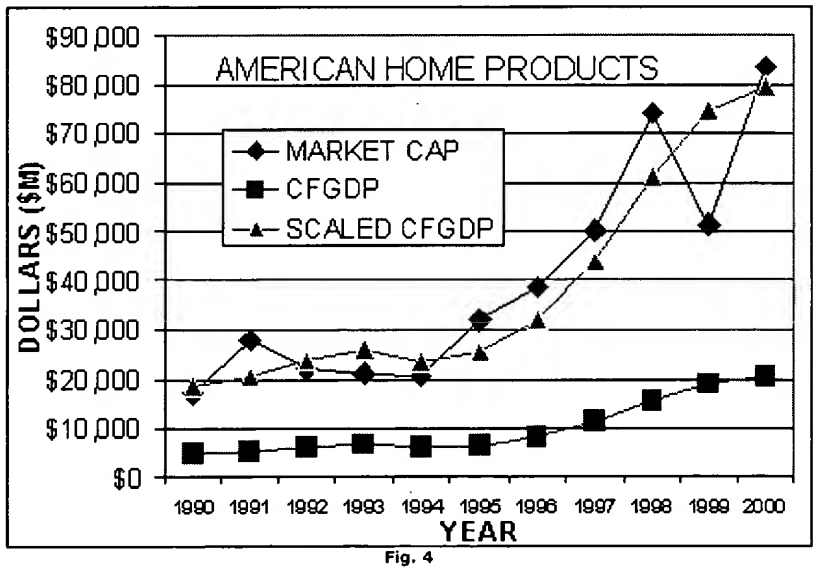

Fig. 4

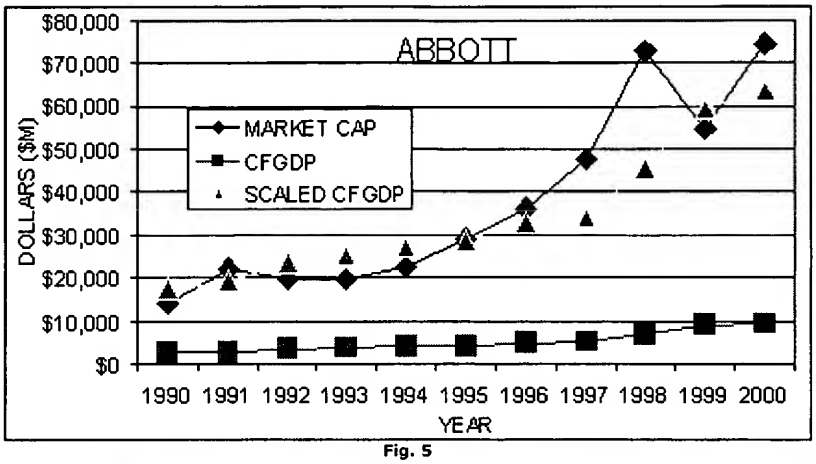

Fig. 5

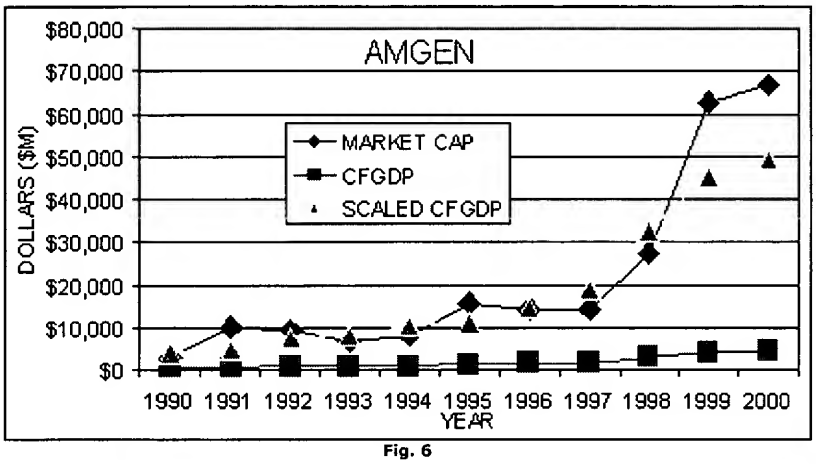

Fig. 6

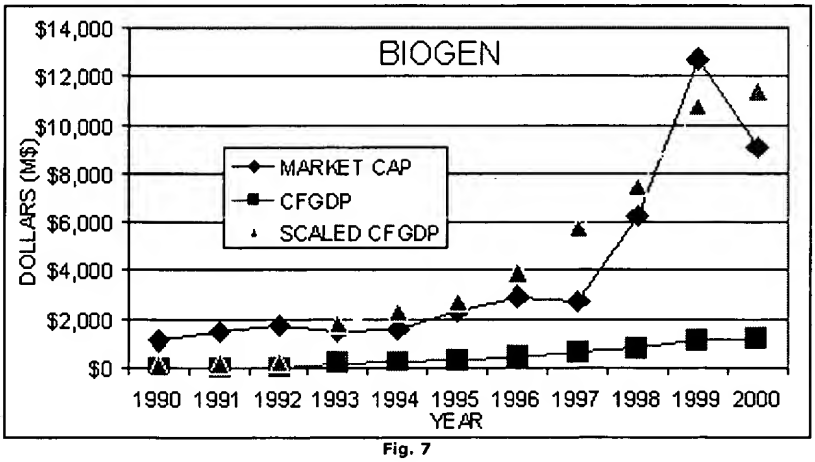

Fig. 7

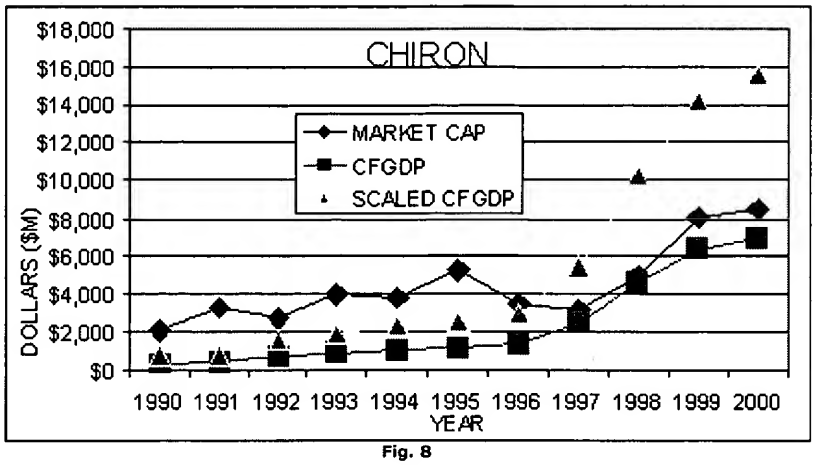

Fig. 8

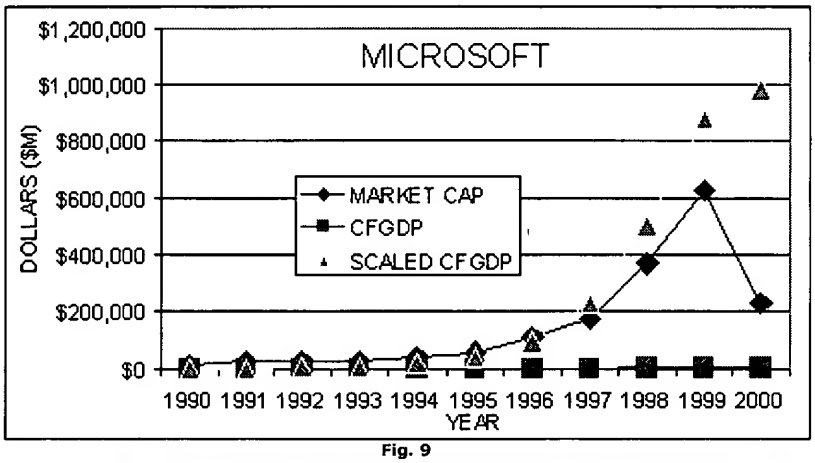

Fig. 9

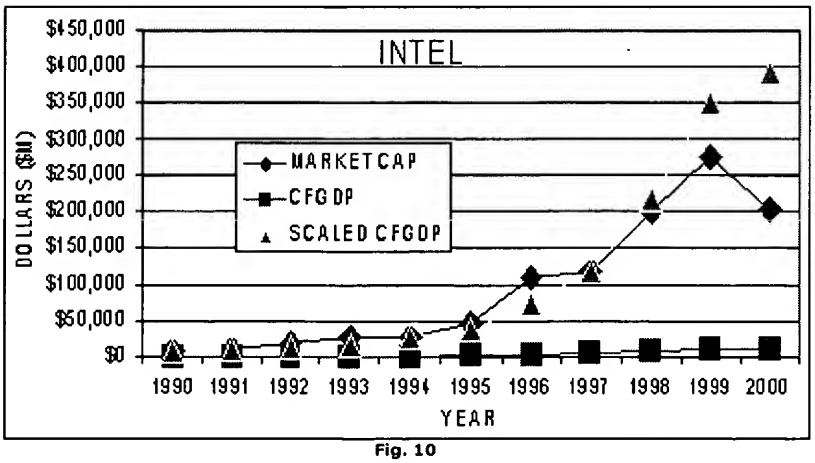

Fig. 10

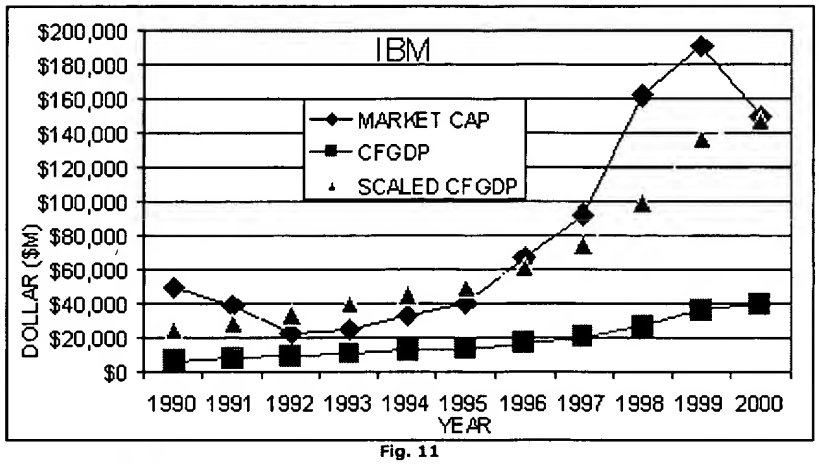

Fig. 11

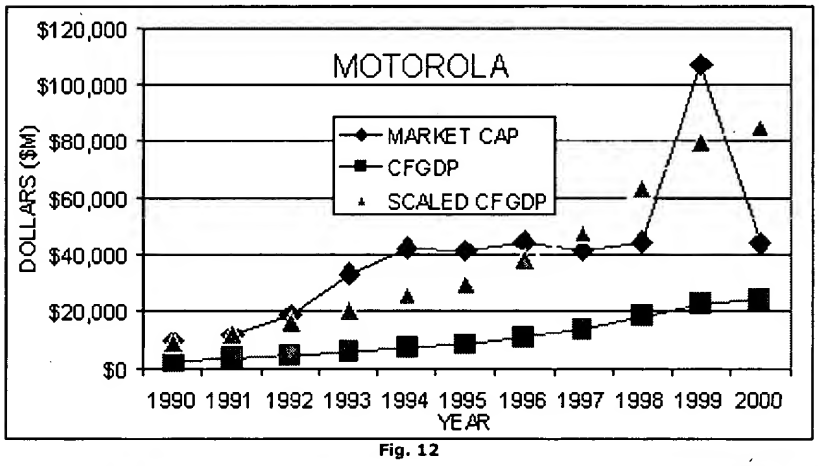

Fig. 12

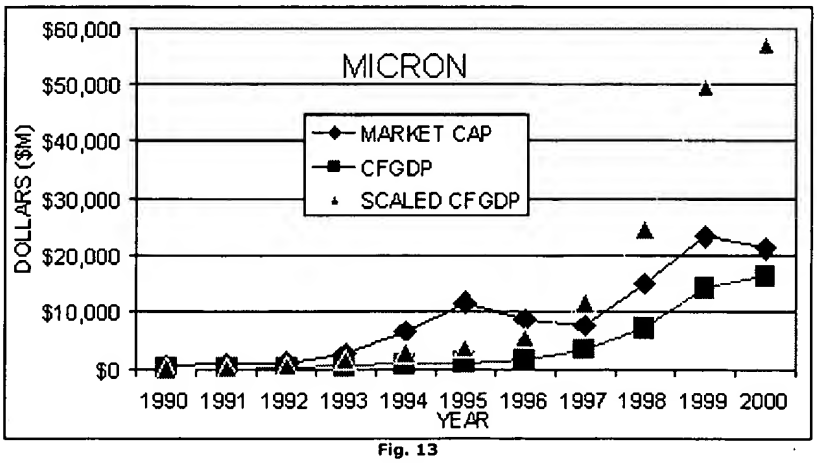

Fig. 13

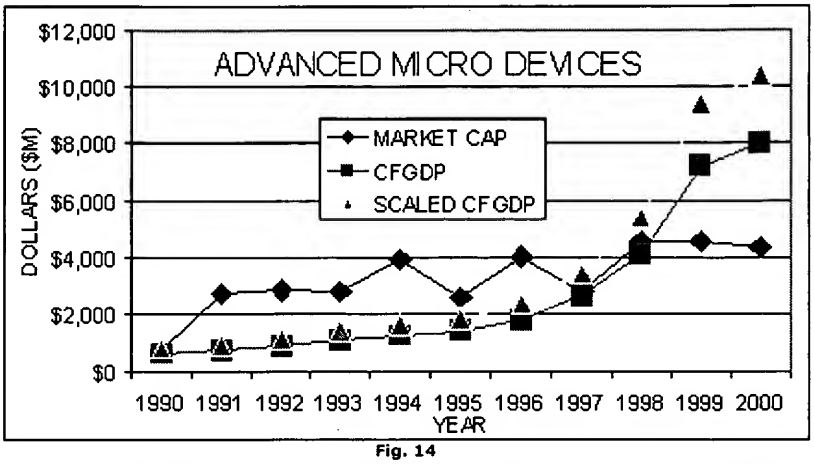

Fig. 14

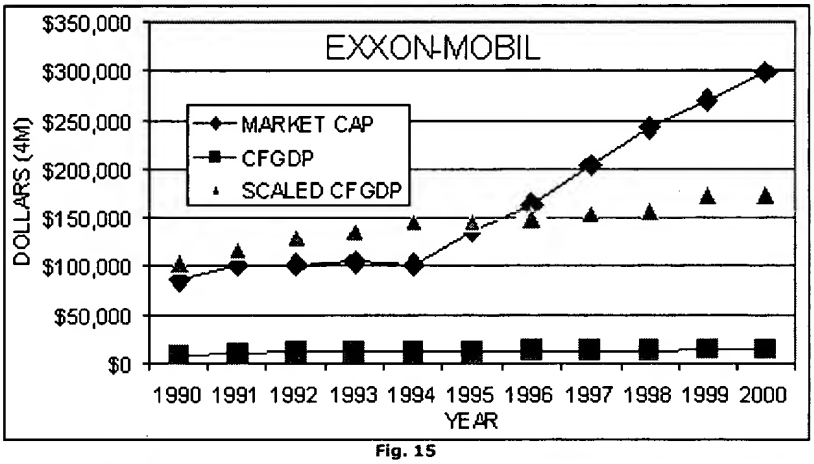

Fig. 15

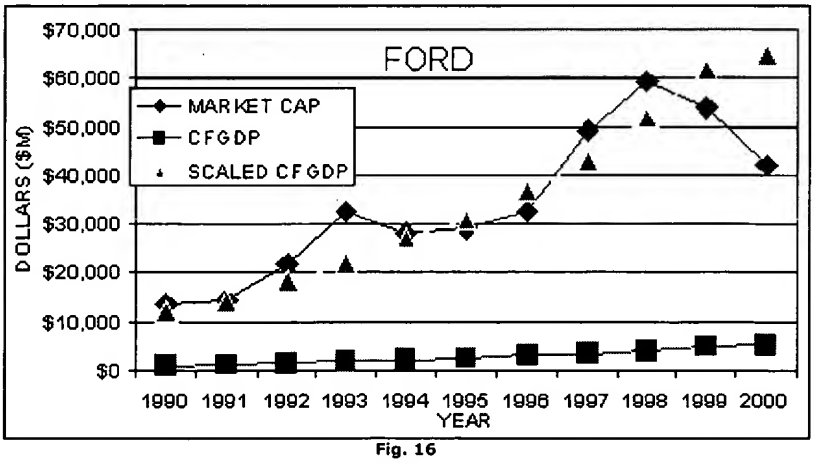

Fig. 16

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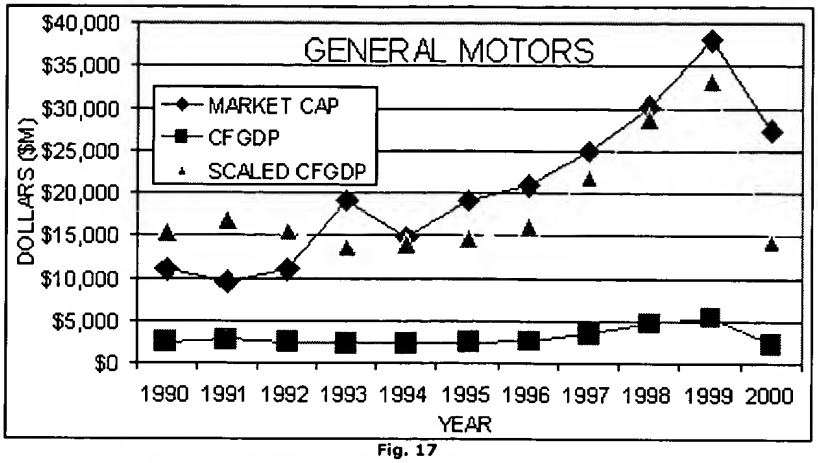

Fig. 17

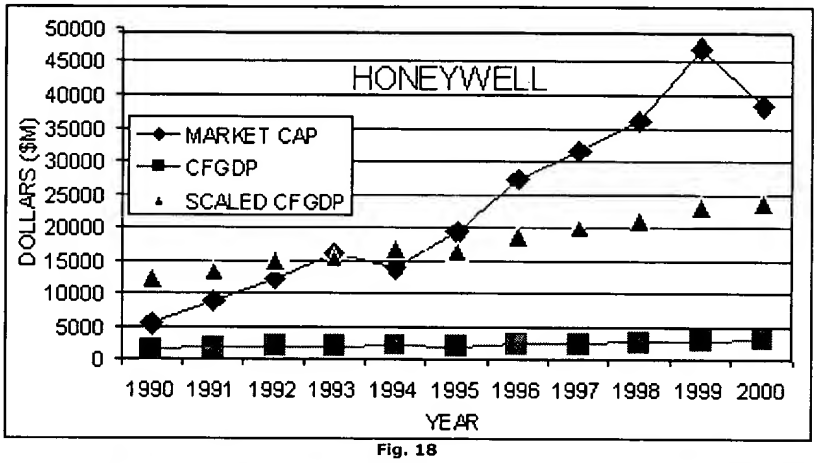

Fig. 18

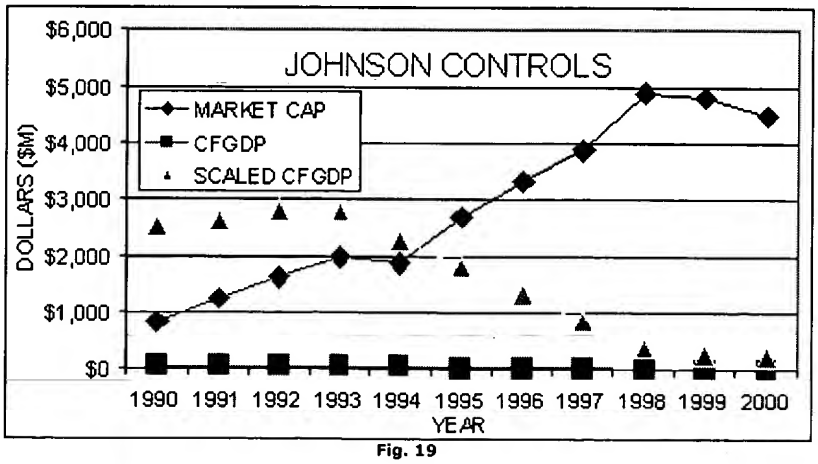

Fig. 19

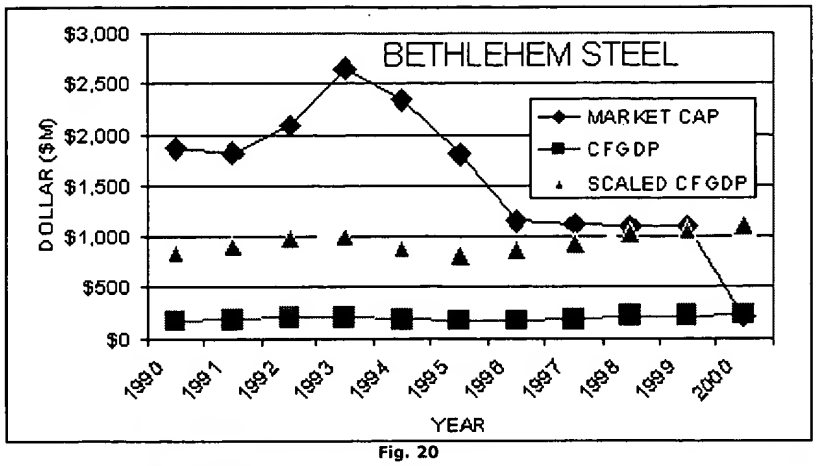

Fig. 20

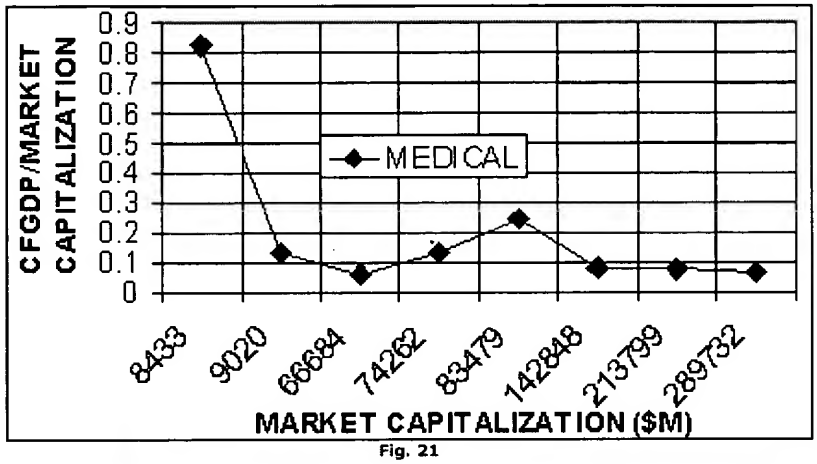

Fig. 21

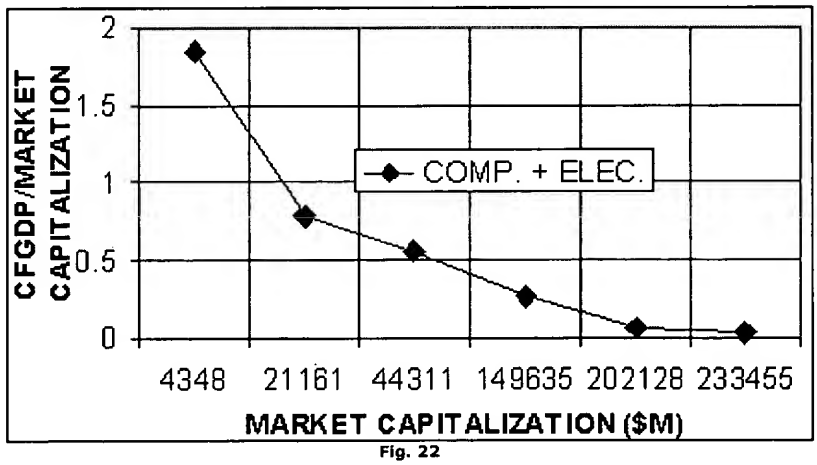

Fig. 22

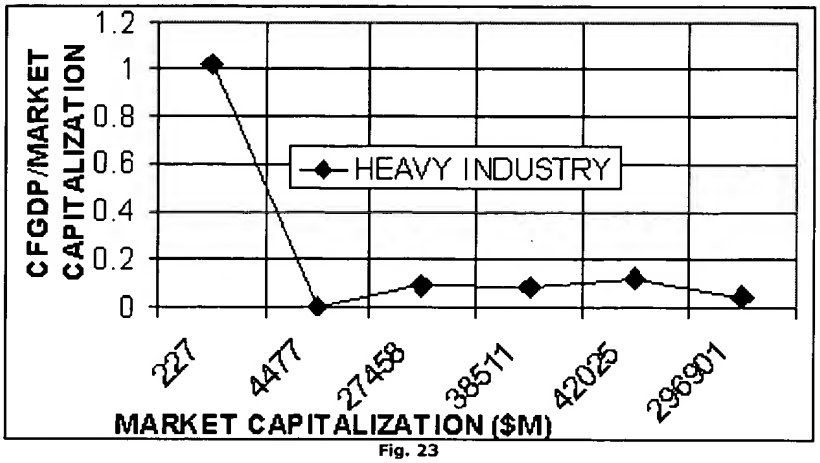

Fig. 23

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1. Richard A. Neifeld, Ph.D., Patent Attorney. I wish to thank my colleague, Martin Goffman, Ph.D. for useful discussions, and I credit him with the conception of the sector dependence alternative of the model. The implementation of the model is the subject of pending patent applications. I can be contacted regarding the macro economic model at rneifeld@neifeld.com.

2. For example, the AIPLA recently formed a committee entitled "Management of IP Assets." One subcommittee of that committee is devoted to exploring patent performance metrics. Also see the discussion relating patents to national economies as a whole in Roy et al., "Global Assessment of Patents, R & D Investment and Economic Output: Part 1 - Macro Economic Comparisons at the Country Level" 79 JPTOS 110 (February 1997).

3. Smith et al., "Valuation of Intellectual Property and Intangible Assets," published by John Wiley & Sons, Inc., New York, NY, Copyright 1994, ISBN 0-471-30412-3.

4. The amount at risk in patent suits, and hence the value of patents in suit appears to have risen dramatically over the last twenty years. Coolley, "Overview and Statistical Study of the Law on Patent Damages" 75 JPTOS 515 (July 1993), reports on patent damage awards during 1982-1992. Coolley shows that there were only three damage awards over one hundred million dollars in 1982-1992, and seventeen awards in the ten to one hundred million dollar range. In contrast, the AIPLA "Report of Economic Survey 1997" page 70 indicated forty practitioners reporting patent infringement suits with amounts at risk of over one hundred million dollars, and one hundred and eighty six practitioners reporting patent infringement suites with estimated amounts at risk of ten to one hundred million dollars. Another measure of the increasing value placed on patents is the number of patents requested and the number granted versus time. The number of issued patents grew from sixty five thousand in 1982 to one hundred and twenty three thousand in 1997. See the "Fiscal Year 1997 Patent and Trademark Review," Table 6, at page 87.

5. Neifeld, "A Macro-Economic Model Providing Patent Valuation and Patent Based Company Financial Indicators," 83 JPTOS 211 (April 2001), now available on the web at the URL:
http://patentvaluepredictor.com/publ_30apr2001_article.asp

6. The automated patent valuation was used in support of a business valuation in a Minnesota dissenters rights case. For details, see the June 27, 2001 press release at http://patentvaluepredictor.com/news_30apr2001.asp. I obtained authorization from the attorney and his client in that case to disclose their use of the patent valuation.

7. The equation is
$C * RPN(1) + C * RPN(2) + C * RPN(3) + \ldots C * RPN(n) = K * GDP$,
where $C*RPN(i) = CFGDP(i)$, and K is the fraction of GDP covered by patent rights.

8. Alternative implementations of the model use the macro economic values for total profits and assume that the sum of profits obtained by patents equal a certain fraction of the annual total of corporate profits.

9. Income theory values an asset based upon the flow of income the asset produces over its useful life by discounting future income derived from ownership of the asset to current value, based upon the time value of money.

10. See http://patentvaluepredictor.com/publ_30apr2001_article.asp at section II.

11. See http://patentvaluepredictor.com/publ_30apr2001_article.asp at section IV, last paragraph.

12. Internal Rate of Return (IRR) is an accounting term used to define the time value of money.

13. Since GDP is time dependent, CFGDP of a single patent is also time dependent. RPN is not time dependent. The results shown in this paper do account for the time dependence of GDP on CFGDP.

14. Current market capitalization data was obtained from http://finance.yahoo.com. Stock data for the period 1990-2000 was obtain from http://finance.yahoo.com and used to extrapolate market capitalization to the 1990-2000 time period.

15. For example, the entity Bristol-Meyers Squibb has significant numbers of patents under names like Bristol Myers Squibb Co, Bristol Myers Squibb, and Bristol Myers Co. Honeywell merged with AlliedSignal. Exxon merged with Mobil. For each company shown in a figure in this paper, I checked for subsidiary companies and predecessors in interest with the Yahoo and Hoovers online services. I added the CFGDP values over the 1990-2000 time period only for those subsidiary companies that were one of the 10,000 companies obtaining the most United States patents over the 1974-2000 time period.
My initial data indicates that twenty eight percent of all United States patents are assigned or re-assigned after issue. The figures in this article do not account for CFGDP due to patent assignments after patent issuance.

16. Id.

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Past Issues

Wednesday, April 21, 2004 Vol. 08: No. 008

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TAXES FINANCE and IP ECONOMICS

This week:

- **NEWS BEAT**
- **THIS WEEK IN PATENTCAFE MAGAZINE**
  - This Week's Cover
  - Special IP Finance Section
- **EVENTS REMINDER ... THE LAST MINUTE**

BUT FIRST ...

NEWS BEAT

Intellectual Property Task Force Announces New Membership, Creates New Working Groups

By PatentCafe Staff (Sacramento)

The Justice Department's Intellectual Property Task Force, which opens up civil remedies to intellectual property violations, follows recommendations recently put forward by US Senators Orrin Hatch (R-Utah) and Patrick Leahy (D-Vt). The focus of the task force is to examine how the DOJ deals with increasing technical complexity of curbing software, film, and music piracy.

Today, Task Force Chairman David M. Israelite announced the new membership of the new IP task force. Created by Attorney General John Ashcroft, the task force will examine all aspects of how the Department of Justice handles intellectual property issues, and develop recommendations for future efforts.

Debra W. Yang, United States Attorney, Central District of California, a new appointee to the task force told PatentCafe that she believes the task force efforts will significantly contribute to increased public visibility of intellectual property infringement and piracy issues. Speaking from her California office, Yang said that "anytime you have a publicized case, it acts not only as a means to educate the public about [piracy], it's also a strong deterrent to other potential violators."
One recent high visibility case her office was instrumental in involved an Illinois man charged with the publication and distribution of illegal copies of screening videos intended to be distributed to Academy Award voters.

Five working groups were formed to address various components of intellectual property violations, including: Criminal law; Civil law; International treaties and obligations; Legislative and regulatory proposals;

and Public awareness.

What contributions will Yang make to the Task Force? She says "Our office was the first to get a conviction under the DMCA. Our contribution to the Task force will include our extensive experience in prosecuting not only copyright piracy cases, but those that involve piracy of hard goods, as well as trade secret cases."

In addition to Debra W. Yang, United States Attorney for the Central District of California and David M. Israelite, who serves as Deputy Chief of Staff and Counselor to the Attorney General, new Task Force members include:
Daniel J. Bryant, Assistant Attorney General for Legal Policy;
Jack Goldsmith, Assistant Attorney General for Legal Counsel;
Peter D. Keisler, Assistant Attorney General for the Civil Division;
Christopher Wray, Assistant Attorney General for the Criminal Division;
R. Hewitt Pate, Assistant Attorney General for the Antitrust Division;
William Moschella, Assistant Attorney General for Legislative Affairs;
Paul Clement, Principal Deputy Solicitor General;
Makan Delrahim, Deputy Assistant Attorney General in the Antitrust Division;
Valerie Caprioni, General Counsel for the Federal Bureau of Investigation;
and Kevin V. Ryan, United States Attorney for the Northern District of California.

The task force will consult with Michael Garcia, the Assistant Secretary of Homeland Security for Immigration and Customs Enforcement, on issues relating to U.S. Customs and Border Protection enforcement of intellectual property. "I am honored that such talented members of the Justice Department have agreed to serve on the task force," said David Israelite, Chairman. "The Attorney General is committed to vigorous enforcement of the law and the protection of intellectual property rights, and those priorities will guide the task force as it seeks to strengthen and improve the Justice Department's efforts in the intellectual property arena." The task force expects to issue a report to the Attorney General on its findings and recommendations by the end of this year.

THIS WEEK IN PATENT HISTORY: April 20th, 1897 - Patent # 581,213 "New and Useful Improvements in Submarine Vessels", patented by Simon Lake, of Baltimore, Maryland.

PATENTCAFE MAGAZINE - *THIS* ISSUE TOP

THIS WEEK'S COVER

How to publish your NEWS story

Dealing With Intellectual Property In Business Combinations - Last year, the SEC's Division of Corporate Finance released a review of 2002 filings by Fortune 500 companies. Of particular note was the conclusion that intellectual property and other intangible asset and goodwill impairment tests were among the critical disclosures that either conflicted significantly with SEC rules or were "materially deficient in explanation or clarity". This finding clearly illustrates that two years after the issuance of FAS 141 and 142 by the Financial Accounting Standards Board ("FASB"), a large number of companies still do not understand the proper way to treat goodwill, intellectual property, and other intangible assets acquired in business combinations. Complete article ...

BUSINESS SECTION TOP

TECHNOLOGY IN BUSINESS SECTION

How to publish your TECH BIZ article

Valuing Individual Patents Within a Portfolio -In this article, we will present a methodology for valuation of individual patents comprising a multi-patent portfolio. Such analysis is necessary for the appraisal of a patent subject to sale, purchase, license or donation. It may also be useful for managerial decisions related to payment of patent maintenance fees or abandonment of certain patents.
For the purposes of this article, a patent portfolio represents a group of patents protecting a single revenue stream. This stream may be generated by a single product or service, a

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product line or by the enterprise as a whole (savings realized by using a patented process are treated as imputed revenue). Note that, theoretically, the value of a patent portfolio protecting a single product or service does not depend on the number of patents in the portfolio, as long as they do not extend the scope of the patent monopoly. Complete Article ...

Patent Valuation from a Practical View Point (Part II) - The PatentValuePredictor Theory for Valuing Patents
Now let me tell you about the PatentValuePredictor model for valuing patents. This model is implemented as a web service, and it provides valuations for all U.S. patents and (a provisional valuation of) published U.S. patent applications in real time.
The PatentValuePredictor simplifies the valuation determination problem by reformulating the problem. It does not attempt to address the many-to-many relationship noted above, and it does not attempt to find and use microeconomic data relevant to any particular technology niche. Instead, it substitutes for the foregoing many-to-many quandary and the (generally unavailable) microeconomic data an estimate of an annual sales covered by the patent. Complete Article ...

Valuing Patents As Market Monopolies -In order to value a patent, it is essential to first grasp the nature of the rights it affords. A patent is the statutory right to exclude others from making, using, selling, offering for sale, or importing the patented invention. It is clear from this definition that the only right a patent offers to its owners is a "negative" right - the right to "exclude others". It is equally clear that an invention is not synonymous with the patent protecting the invention. Moreover, a patent does not necessarily even afford its owner the right to practice the patented invention, as such practice may infringe the patents of others. Donald S. Chisum, Craig Allen Nard, Herbert F. Schwartz, Pauline Newman, F. Scott Kieff, Principles of Patent Law (1998). If an invention and the patent protecting it are not synonymous, it is clearly a mistake to value a patent by appraising the underlying invention - a mistake that, regrettably, is all too often made. Complete Article ...

MORE DEPARTMENT ARTICLES: more articles

- Patent Valuation from a Practical View Point - Part I
- Patent Valuation from a CPA's View Point

EVENTS REMINDER ... THE LAST MINUTE TOP

SEE INVENTORS CONTESTS AND IP EVENTS FOR SPRING/SUMMER 2004

April 28-30, 2004 Brazil
IP Commercialization (I COMPI) International Congress
This congress has been conceived as a World Class congress bringing together Brazilian and overseas specialists to discuss strategic issues about IP.
For detailed information and registration please visit the I COMPI website **HERE.**

May 20-21, 2004 London, GB
IP Licensing Conference "Practical and Innovative Strategies For Maximizing the Effectiveness and Value of Your IP Portfolio"
This advanced and interactive conference covers the key aspects and hot topics in the IP arena with practical examples and advice given at every stage. Delegates will gain a thorough understanding of these aspects from a panel of top legal experts and industry insiders from leading companies including Hammonds, Philips, Bristows, Cambridge Antibody Technology Group and others. View the agenda **HERE.**

May 31, 2004, Hammacher Schlemmer in conjunction with PatentCafe.com
Hammacher Schlemmer's Search for Invention
Hammacher Schlemmer's Search for Invention in conjunction with PatentCafe.com, Application Deadline: May 31st, 2004 Inventors are welcome to submit entries in the four following categories - Recreation; Personal Care; Personal Electronics; Utilitarian Home & Garden. Prizes total $12,000, with $6,000 for the Grand Prize winner and separate prizes of $1,500 each for a winner in every category. A panel of judges consists of respected consumer product specialists. Final judging takes place on September 20th, 2004 in Hammacher Schlemmer Chicago Store. Entry forms at:
http://www.patentcafe.com/hammacher/index.asp

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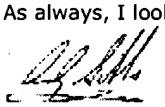
June 5, 2004, Mississippi Polymer Institute, Hattiesburg, Mississippi
Mississippi Inventors' Conference - Learn to Earn from Your Invention
Speakers/Workshop Conductors: USPTO patent examiner, Greg Mills, - inventor and former Vice President of R&D for Spraytex Corp.; Don Kelly - CEO of the Intellectual Asset Management Associates (IAMA), founder of USPTO Office of Independent Inventors; Tim McFadden of Office of Law Enforcement Technology Commercialization; Anne Kelly of Federal Consulting Group and formerly of USPTO; Marcia Rorke of Mohawk Research Corp. - former contact to commercialize products for inventors who got DOE grants; also patent attorneys and other participants. Details-**HERE**

See All Events - Starting Out 2004 http://www.patentcafe.com/events/index.asp

** *Send us details about **your** upcoming IP Event for posting. Send details HERE*

As always, I look forward to your comments and recommendations.



Andy Gibbs
CEO, PatentCafe.com

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PATENT VALUE PREDICTOR

What it Does ▶ How It Works ▶ See Sample Report ▶ Run a Valuation Report

DETERMINE A PATENT'S ESTIMATED VALUATION: Patent Value Predictor is the proprietary, Automated C Demand service where you specify a patent and then receive our model's estimation of the *VALUE OF* the pate and the *SIZE OF THE MARKET* (in sales per year) protected by the patent.

Fast Information For Decision Makers

Who needs Patent Valuation? Technology owners and Licensees need a way to help gauge the value of a patent being considered for licensing. PatentValuePredictor is used by:

- Inventors & Technology Owners
- Accountants and financial Managers
- IP & Tech Transfer Managers

For strategic, planning and analysis including:

- Helping estimate technology or portfolio valuations
- Acquisitions, Mergers & Taxes
- Competitive Business Intelligence
- Investment Decisions
- Baseline Licensing Negotiations

Overview of Patent Value Predictor

Patents are awarded by the Federal Government for new and useful products or services, and allow the owner to right to exclude others from making, using, or selling a product or service.

The Patent Value Predictor Model is based on the business assumption that a substantial fraction of Gross Domestic Product (GDP) is covered by all patents, and then estimating the fraction of the GDP covered by each patent using sophisticated data analysis and additional modeling based upon macro economic data and financial data.

Patent Value Predictor models the profit associated with a patent to be the fraction of the GDP covered by the patent (i.e., the nominal sales of product that our model predicts to be covered by the patent) times the profit margin. From that information Patent Value Predictor obtains the annual profit protected by the patent.

Patents are each in force for a term of about 17 years. Consequently Patent Value Predictor calculates the current value of the patent to be value of the annual profit for the estimated remaining term of the patent.

Adding up the valuations for any given patent(s), Patent Value Predictor arrives at the estimated current patent valuation.

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PATENT VALUE PREDICTOR

▶ What it Does ▶ How It Works ▶ See Sample Report ▶ Run a Valuation Report

A Macro-Economic Model Providing Patent Valuation and Patent Based Company Financial Indicators[1]

I. Introduction

Summary

I present a new and useful macro economic model for valuing patents.„ The model provides equations predicting the market share for products and services covered by a patent. One benefit of the macro economic model is that it enables inexpensive automated determination of the value of any patent. One drawback of the macro economic model is its reliance on a nominal determination of market share. However, the reliance upon a nominal determination of market share obviates data defining the actual market and actual sales covered by the patent, and that twist is what makes the model feasible to implement!

Applying income valuation theory to the annual net earnings provided by the patent for the remaining term of the patent results in a valuation for the patent. Extensions of the model to the time dependence of company patent portfolios provides patent based company financial predictors.

I have implemented the macro economic model in a programmed computer system, and I have used that system to automatically generate valuations for all enforceable non-expired U.S. patents. Valuations resulting from the model should„ available by the time this article is in print at www.patentvaluepredictor.com. Patent values obtained in January 2001 (for three patents issued in each of the last 10 years) appear in the following table.

PN	IssuedSD	ExpDate	Value	Title	Assignee
4890341	1/2/90	1/2/07	$1,652,873.84	Invalid's bathtub	Joycelyn Forbes
4890335	1/2/90	1/2/07	$363,834.27	Ventilated welding shield	Arnold E. Crowson
4890336	1/2/90	1/2/07	$2,420,845.75	Welding protected coveralls	Barry Worton
4980936	1/1/91	1/1/08	$4,970,871.56	Closed cell foam ground pad and methods for making same	James M. Lea
4980930	1/1/91	1/1/08	$1,136,480.94	Garment waistband construction	Crown Textile Company
4980939	1/1/91	1/1/08	$461,331.15	Water filled cushion	Peter A. Smith
4980935	1/1/91	1/1/08	$2,327,225.60	Beach towel and pillow removably contained within carrying bag	Cambridge Products
5079000	1/7/92	1/7/09	$1,714,534.23	Clathrate composition including essential oils and method of using same	Kurita Water Industries Ltd.
5078013	1/7/92	1/7/09	$2,212,703.13	Ultrasonic measuring apparatus using a high-damping probe	Shimizu Construction Co., Ltd.
5078481	1/7/92	1/7/09	$9,018,874.57	Magnification changing lens	Canon Kabushiki Kaisha

5175904	1/5/93	1/5/10	$563,518.11	Wringing device in particular for fringed strips for cleaning floors	VDM S.r.l.
5175897	1/5/93	3/24/09	$357,107.24	Cover for hospital bed rails	John J. Marra, Jr.
5175898	1/5/93	4/22/03	$2,490,031.01	Sculptured, stretchable waterbed mattress with aesthetic appearance	Advanced Sleep Products
5274856	1/4/94	1/4/11	$2,607,921.01	Portable hygenic apparatus	Les Placements Jean-Claude Lemyre Inc.
5274857	1/4/94	1/4/11	$685,513.69	Bath and shower device with a bath tub and a related shower partition	Ideal-Standard GmbH
5274858	1/4/94	1/4/11	$2,018,302.01	Shower soap system	Gerald W. Berry
5377376	1/3/95	1/3/12	$3,650,697.23	Mobile surface cleaning machine	Advance Machine Company
5377369	1/3/95	1/3/12	$19,431,862.27	Bottom structure of a bed	Paramount Bed Company Limited
5377370	1/3/95	1/3/12	$10,104,193.05	Hospital bed with collapsing wing	Hill-Rom Company, Inc.
5479666	1/2/96	1/2/13	$35,128,362.16	Foot egress chair bed	Hill-Rom Company, Inc.
5479668	1/2/96	1/2/13	$374,448.41	Revolving suntan bed	Richard W. Cooper, Jr.
5479658	1/2/96	1/2/13	$10,252,291.15	Face mask and face mask cover	Daniel S. Harris
5590429	1/7/97	1/7/14	$3,200,181.41	Electrophysiology table	General Electric Company
5590430	1/7/97	1/7/14	$10,335,770.40	Gel filled deformable cushion and composition contained therein	Joel L. Sereboff
5590431	1/7/97	1/7/14	$4,770,054.25	Stretcher frame clamp	Kevin R. O'Connell
5704072	1/6/98	1/6/15	$2,183,190.04	Occipital retention strap for cyclist headgear	9001-6262 Quebec Inc.
5704074	1/6/98	1/6/15	$919,808.94	Toilet gas suction vent	Pavel Baldea
5704075	1/6/98	1/6/15	$4,497,005.84	Stay-dry toilet seat	Mindy Machanic
5855031	1/5/99	1/5/16	$532,160.60	Crib with infant hammock	Wade Swift, Jr.
5855032	1/5/99	1/5/16	$5,102,405.13	Quilt	Kimberley D. Field
5855033	1/5/99	1/5/16	$3,418,122.16	Inflatable beach bed	Marinus Anthonius Maria Van Tol
6009566	1/4/00	1/4/17	$1,407,191.09	Head and neck support for racing	Robert P. Hubbard
6009567	1/4/00	1/4/17	$1,407,156.88	Inline sanitary conditioning system	Waterbury Companies, Inc.
6009568	1/4/00	1/4/17	$4,568,312.86	Opening-closing device of western style toilet seat and seat cover	Katoh Electrical Machinery Co., Ltd.

The model predicts much larger values for some patents. The largest patent value determined using the model is $6.2 billion.

In sequence below, I discuss the importance of patent valuation, define valuation, discuss conventional valuation of patents, define the macro economic model, discuss the reasonableness of the axioms defining the macro economic model, extend the model to provide patent based company financial predictors, and then discuss methods for validating the results of the model.

B. **The Significance of Patent Valuation**

Valuing patents is important for many purposes including determining business values, capital allocations, taxes, licensing rates, and patent infringement damages. There is a

growing interest in valuing patents because our economy is shifting from a tangible assets based economy to an intangible assets based economy.[2] The business world has recognized that the intangible assets of many companies exceed the value of their tangible assets,[3] and that patents are part of these intangible assets.[4]

C. **Conventional Patent Valuation**

Valuation is an accounting term which means a lump sum of money payable to receive the future benefits of an asset at a particular time.[5] There are three generally accepted accounting theories for valuing assets: market, cost, and income. Market theory values an asset as the present value ascribed to similar assets in an active public market. Cost theory values an asset by the cost of replacing the asset. Income theory values an asset by the present worth of the net anticipated economic benefit of the asset.

Market theory valuation of patents has little or no utility because no two patents are similar enough for the sales price of one to define the value of another. Moreover, until recently, there was no public market.[6] Cost theory is generally inapplicable since a patent cannot be replaced.

Conventional methods for using income theory to value a patent analyze micro economic data to determine the anticipated economic benefit of owning the patent. This micro economic data includes market data indicating the gross sales and net income derived from the sale of products covered by the patent, and the revenue derived from licensing the patent.

Applying income theory to micro economic data to value a patent is labor intensive, costly, and complex. This method requires an analysis to determine the meaning of the claims of the patent, a comparison of products to the claims of the patent to determine what products are actually covered by the patent, a determination of the size of the market covered by the patent, and a determination of the cost advantage of the patented technology compared to alternative technologies for that market. A micro economic analysis may be necessary to prove damages in patent infringement litigation. However, a micro economic analysis of a patent is often cost prohibitive for purposes of business valuation, capital allocation, taxes, and licensing.

Moreover, the data necessary for members of the public to perform micro economic analysis of patents is simply not available. This is because that data includes relationships between patents, product lines, product line specific costs and earnings information, and licensing royalty rates and terms, and companies rarely release that type of information to the public. Thus, micro economic analysis of patents is often not feasible. The model presented below fulfills the need for an economic analysis of patents.

II. **The Macro Economic Model For Valuing Patents**

A first axiom of the model is that each enforceable patent covers a fraction of Gross Domestic Product (GDP) of the country in which the patent is enforceable. I name this fraction,, CF_j where j represents the jth enforceable patent.

The sum of the fractions of GDP covered by all of the enforceable patents equals a fraction, K, of GDP. The first axiom provides the equation:

$$K * GDP,, =,, \Sigma\, CF_j \quad (1)$$

where Σ represents the sum over j = 1 to n, and where n is the number of enforceable patents.

A second axiom is that the CF_j is a function of certain formal characteristics of the patent such that the function correlates to the strength and breadth of the claims of the patent. These formal characteristics include, for example, measures of the length of the independent claims, the statutory classes of the independent claims, the number of independent claims, the number of claims, the length of the specification, the number of figures, the number of examples, the number of embodiments, the number of references cited, etc. I name the variables which are the measures of these formal characteristics, v1, v2, v3, ..., I name this function the RPN (relative patent number) function. The second axiom provides the equation:

$$CF_j = C * RPN_j(v1, v2, v3...) \quad (2)$$

where C is a proportionality constant.

Substituting (2) into (1) yields the equation:

$K * GDP = C * \Sigma RPN_j(v1, v2, v3...)(3)$

I measure the values of v1, v2, v3 ... for the jth patent and evaluate $RPN_j(v1, v2, v3...)$ for the jth patent to obtain a value RPN_j for $RPN_j(v1, v2, v3...)$ so that:

$$K * GDP = C * \Sigma RPN_j \quad (4)$$

I know the values for GDP and ΣRPN_j. I select K to be unity[7] and solve for C. Substituting the value for C and the value RPN_j for $RPN_j(v1, v2, v3...)$ into (2) solves for CF_j. I now have values for all of the CF_js.

A third axiom of the model is that there is a profit margin, M_j, associated with the sale of goods and services covered by the jth patent.

Combining the third axiom with (2) provides:

$$P_j = M_j * CF_j = M_j * C * RPN_j \quad (5)$$

where P_j is the annual profit provided by the sale of goods and services covered by the jth patent.

A fourth axiom of the model is that the jth enforceable patent is the asset that provides the profit P_j. A result of the fourth axiom is that the value of the patent can be determined using conventional income theory by calculating the present value of P_j annual income attributable to the patent over the enforceable life of the patent.

The generic formula for valuing a stream of income using conventional income theory is:

$V = \Sigma I/(1+R)^k$ (6)

where Σ represents a summation over the k = 1 to N time periods in which the income I is received, and where R represents the internal rate of return (which is the discounted present value of the right to future income). Substituting (5) into (6) for the jth patent provides the current value V_j of the jth patent:

$$V_j = \Sigma P_j/(1 + R)^k \quad (7)$$

where Σ represents a summation over the k = 1 to N years that the patent will be enforceable.[8]

I select R to be 0.14 (14 percent), since this is the often quoted historical rate of return on common stocks, and because I perceive a primary utility of this model to be for decisions on allocation of capital.[9] I select M_j for all j to equal M_A, where M_A is the average corporate profit margin across the entire economy.[10] I evaluate V_j using these selections in (6) to obtain a value for each currently enforceable patent.[11]

III. **Reasonableness of the Axioms and Selected Values**

I consider an axiom to be reasonable if the axiom tends to result in patent valuations correlating to valuations of the patents that would be obtained using income theory analysis of micro economic data.

Selecting the fraction of GDP covered by all of the enforceable patents to be unity is arbitrary. I believe (based upon anecdotal evidence only) that most GDP is covered by patent rights. I know of no economic data defining the fraction of GDP covered by enforceable patent rights.

Axiom 2 assumes a correlation between the gross sales of products covered by patents and the strength and breadth of the patents. This is the fundamental assumption of the macro economic model since it provides that the CF equals the gross sales of products

covered by the patent. If the CFs of patents correlate to the actual gross sales of products covered by the patents, then axiom 2 is reasonable.

The value selected for the R has a significant effect on the value the model determines for patents (1) because patents are enforceable for multiple years and (2) because of the compounding factor $(1+R)^k$ in the multi year income theory analysis. However, that compounding factor effect on valuation is present in any income theory based valuation.

Axiom 4 explicitly excludes the contribution to profits due to the assets involved in manufacturing, sales, other IP, and contracts associated with the sales of products covered by the patent. Those other assets may dilute the patent's contribution to profit. However, it may be that those other assets, absent the existence of the patent, would only result in a competition-driven low or negligible profit margin, and that all substantial profit margin is due to the exclusivity provided by the existence of the patent. This axiom reflects the well known difference in profit margins between a monopolized market and a free competition market. Hence, this axiom is not unreasonable.

It is useful to compare the results obtained using the macro economic model to results obtained using micro economic data, for a limiting case. Consider the limiting case evaluating the sum of all enforceable patents. A micro economic analysis would determine that a fraction of GDP was covered by enforceable patent rights. I assume for this example that that fraction is unity, so that the micro economic analysis shows that the fraction of GDP covered by enforceable patent rights is unity. In the macro economic model, summing up the fractions of GDP covered by each enforceable patent also results in the GDP. Hence, when the sum of all enforceable patents are considered, the macro economic model and the micro economic model will provide the same results. Therefore, the correlation between the predictions of the macro economic model and a micro economic analysis will converge as the number of patents under consideration increases. Hence, the model should be more accurate when applied to portfolios of patents, such as those owned by artificial legal entities, which is the subject of the next section.

IV. Extensions of the Macro Economic Model to Company Patent Portfolios: Patent Based Company Financial Indicators and Their Time Dependence

Aperiodically, patents owned by a company expire, and new patents owned by the company issue. Each patent is enforceable for a discrete amount of time. At least for those reasons, the value of a company's patent portfolio, V_T, changes with time. Using the valuations obtained by this model and the term of enforceability of each patent, I can calculate the time dependence of V_T.

For the reasons explained below, the sum of CF_j (equation 2) for all patents owned by a company, CF_T, should correlate to a company's gross sales, and the sum of P_j (equation 5) for all patents owned by a company, P_T, should correlate to the company's net earnings. In the macro economic model, the sum of CF_T for a company provides a value which is the nominal fraction of GDP covered by all of the company's sales. The company's gross sales define the actual fraction of GDP produced by the company. I have normalized the sum of CF for all patents to GDP and the sum of goods and services produced by all companies is in fact GDP.[12] Therefore, the average over all companies, of the difference between CF_T and the actual fraction of GDP produced by a company, is zero. This limitation statistically constrains CF_T to correlate to the actual of sales of a company. As discussed above in the limiting example at the end of the last section, the CF_T tends to converge on the actual gross sales of the company when the number of patents evaluated increases. Moreover, a company's patents are more likely to cover the actual goods and services produced by that company than another company, since (1) the company cannot rightfully produce goods and services covered by patents of another entity, (2) no other entity has the right to produce goods and services covered by the company's patents, and (3) entities primarily attempt to get patents covering their products in order to protect their markets. For all of these reasons, CF_T should approximate a company's gross sales. Based upon the same reasoning, P_T should approximate a company's actual net earnings.

CF_T can be viewed as what a company's sales should be if the company's patents cover the company's products and services and no other products and services. P_T can be viewed as what a company's net earnings should be if the company's patents cover the company's products and services and no other products and services. The corollaries to these conclusions are that corporate gross sales exceeding CF_T indicate that the company has weak patent protection in the sense that its patents do not cover all of its products and services and that other entities' patents may cover some of the company's products and services. Conversely, CF_T exceeding corporate gross sales indicates that the company has strong patent protection in the sense that its patents cover its own products and services and may cover other entities products and services. A company whose patents extend to markets other than the markets in which the company is currently active can be expected to expand into those markets. A company whose patents do not cover its existing markets can be expected to contract in those markets in response to the

exclusive rights of others. In addition, weak patent protection indicates low profit margins and strong patent protection indicates high profit margins. Hence, the ratio of CF_T to the company's gross sales is an indicator of whether the company's sales and profit margins should be increasing or decreasing. Likewise, the ratio of P_T to the company's actual net earnings is an indicator of whether the company's profit margins should be increasing or decreasing.[13]

It typically takes a few years from the time a company changes the amount of capital allocated to patent generating activities until there will be a significant change in the rate at which the company obtains patents. This is because research activities typically have invention payoffs a few years after the research is initially funded, and it takes a few years, on average, from the time an application for patent is filed until a patent is granted. Moreover, the expiration date of existing patents owned by a company can be extrapolated seventeen years into the future. Therefore, extrapolations of CF_T, P_T and V_C a few years into the future may be statistically significant predictors of a company's future of CF_T, P_T and V_C, and therefore significant predictors of the company's future sales and earnings. Since historical values for CF_T, P_T, and V_T can be derived from historical data, I can extrapolate the time dependence for these quantities to future times using trend line analysis. Hence, the extensions of the basic model provide company financial analysis tools.

Several alternatives and refinements to the basic model are feasible.

Instead of using GDP as the macro economic datum, the model is applicable to a direct macro economic measure of corporate profits in which case the step of multiplying the CF of a patent by a profit margin to determine net income is bypassed.

Instead of relying upon axiom 1, the macro economic model could distinguish between economic sectors. The alternative model could equate the CF of all enforceable patents associated with the economic sector with the fraction of GDP associated with the economic sector. Data for the fraction of GDP associated with each economic sector defined by SIC code is available. Patents may be associated with economic sector by associating the USPCS code for the patent with an SIC or NAISC code.

The profit margin associated with the patent may adjusted down by an amount equal to a„ profit margin associated with a free market. The profit margin associated with a free market, such as a commodities market, is a profit margin that exists for products and services produced without patent protection. A commodities market's profit margin is an estimate of the profit margin provided by non-patent assets.

V. **Validation of the Model**

Actual patent valuations are not a useful measure for validating the model because of the significant compounding effect of the selected value of R. Of course, anecdotal patent sales values could be assembled and compared with the model's valuations from which statistical deviations could be calculated. However, actual patent sale data is scarce and anecdotal evidence would not be rigorous.

Better measures for validating the model would be CF_T and to a lesser extent P_T, since CF_T and„ P_T do not depend upon multi year extrapolations. CF_T should correlate to company's gross sales. P_T should correlate to the company's net earnings. Historical values of CF_T and P_T can be calculated from recorded assignment data for the company's patents. Historical sales and earnings data is available for publicly traded companies. Hence, it is feasible to determine the correlation of CF_T to sales, and of P_T to earnings, as a function of time for publicly traded companies.

Another method for validating the model is to look at the effect of the issuance of a single patent on the sales, earnings, and market capitalization of the assignee company. If the value of the patent is large relative to the sales, earnings, and market capitalization of the company prior to the patent's issuance, the company's sales, earnings, and market capitalization should significantly increase as a result of the issuance of the patent.

I have not yet attempted a systematic validation of the model. I intend to report on validation in a subsequent article.

VI.**Conclusion**

I present a new macro economic model that enables patents to be valued without relying upon data for actual sales of products covered by the patents or actual costs associated with generating those sales. The model is readily implemented for all patents because it does not require sales and costs of sales data for actual products to be associated with

specific patents. Extensions of the model provide financial indicators based upon company patent portfolios. The patent valuation model has been implemented, and patent valuations based upon it are commercially available. Work is in progress to implement extensions of the model that provide patent based financial indicators, and to validate the results of the model.

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[1] Richard A. Neifeld, Ph.D., Patent Attorney. I wish to thank my colleague, Martin Goffman, Ph.D. for useful discussions, and I credit„ him with the conception of the sector dependence alternative of the model. The implementation of the model is the subject of pending patent applications. I can be contacted at rneifeld@neifeld.com. See www.patentvaluepredictor.com for implementation of the model and various financial products derived therefrom. First publication at 83 JPTOS 211 (2001).

[2] For example, the AIPLA recently formed a committee entitled "Management of IP Assets." One subcommittee of that committee is devoted to exploring patent performance metrics. Also see the discussion of patents to economies as a whole in Roy et al., "Global Assessment of Patents, R & D Investment and Economic Output: Part 1 - Macro Economic Comparisons at the Country Level" 79 JPTOS 110 (February 1997).

[3] See Smith et al., "Valuation of Intellectual Property and Intangible Assets," published by John Wiley & Sons, Inc., New York, NY, Copyright 1994, ISBN 0-471-30412-3.

[4] The amount at risk in patent suits, and hence the value of patents in suit appears to have risen dramatically over the last twenty years. Coolley, "Overview and Statistical Study of the Law on Patent Damages" 75 JPTOS 515 (July 1993), reports on patent damage awards during 1982-1992. Coolley shows that there were only three damage awards over one hundred million dollars in 1982-1992, and seventeen awards in the ten to one hundred million dollar range. In contrast, the AIPLA "Report of Economic Survey 1997" page 70 indicated forty practitioners reporting patent infringement suits with amounts at risk of over one hundred million dollars, and one hundred and eighty six practitioners reporting patent infringement suites with estimated amounts at risk of ten to one hundred million dollars. Another measure of the increasing value placed on patents is the number of patents requested and the number granted versus time. The number of issued patents grew from sixty five thousand in 1982 to one hundred and twenty three thousand in 1997. See the "Fiscal Year 1997 Patent and Trademark Review," Table 6, at page 87.

[5] See Henry A. Babcock, Ph.D., FASA, "Appraisal Principles and Procedures," Chapter 6, p. 95, (1995), published by the American Society of Appraisers, Washington, DC.

[6] A few companies have launched online patent exchanges for the sale and licensing of patents, which may eventually evolve into an active public market in patent sales and licensing, including "The Patent and License Exchange, Inc." and its web site at www.pl-x.com.

[7] If there is macro economic data indicating what fraction of GDP is covered by patent rights, that fraction of GDP may be used.

[8] Alternatively, anticipated annual variations in sales and in P_j over time may be included in the equations where industry wide variations due to product life cycle are anticipated. For example, for pharmaceutical patents where market data may indicate expected life cycles for sales of patented drugs.

[9] Alternatively, R may be economic sector dependent, depending upon the different perceived risks and rewards for patents in different economic sectors.

[10] Various alternative profit margins may be selected. For example, the profit margin for each patent may be selected to be the average profit margin in the economic sector most closely associated with the claims of that patent. Economic sectors of a patent can be automatically determined, for example by correlating the United States Patent Classification System (USPCS) codes for the patent to the Standard Industrial Codes (SICs) or NAISCs. NAISCs are industrial classification codes replacing SIC codes. Both GDP and corporate profit margin broken down by SIC and NAISC codes are publicly available.

[11] Without selecting values, the general formula is:

$$V_i = \Sigma_k \left(\left(K * GDP * M_i * RPN_i(v1, v2, v3...) / \left(\Sigma_j RPN_j(v1, v2, v3...)\right)\right) /(1 + R)^k\right)$$

[12] By companies, here, I refer to all entities that contribute to GDP.

[13] Note that, when P_j is a function of economic sector of the jth patent, P_T and CF_T do not track one another.

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August 2003

Patent mining in a changing world of technology and product development

Patent mining is one of the buzz words of intellectual property management and for many seems to promise untold riches generated from rights portfolios that would otherwise lie dormant. In reality, however, this is very rarely the case. Patent mining is no quick fix, neither is it a solution that will work in all organizations. But for those that are willing to take risks and invest time and money in the process, the benefits could be considerable. By ***Edward Kahn***

When I got off the plane recently in San Jose, California, the first display ad on the airport wall read: "Who owns the patents owns the market." Looking at that, I realised how much has changed in the world of intellectual property management, joint product development, and high technology business, generally, since 1986 when EKMS was launched.

The very concept of proactively studying one's own patent portfolio and conveying those patent rights to anyone else (much less a competitor!), would have been alien to companies holding patents. Today, high-tech companies, like Proctor & Gamble, proudly teach that they will license competitors, sometimes before the technology is even used in their own products. According to Jeff Weedman, P&G's Vice President of external business development and global licensing: "Competitive advantage used to mean 'I've got it and you don't'. Now it can mean, 'we both have it and can make money off of it'."

Patent mining in today's environment

In this atmosphere, patent mining should be defined in the broadest context of a technology company's strategic view. No one has yet said it better than Dr. Joe Daniele, former Director of Licensing at Xerox, when he stated in a 1993 speech (given with the author) before the Licensing Executives Society (LES): "IP management is the direct connection of R&D to the marketplace." It is not a coincidence that the speech was given the same year as Dow went public with its then revolutionary Intellectual Asset Management programme.

Those companies that were only willing to tentatively dip their toes into the water of change began to limit patent mining's reach to the study of underutilised patents in their portfolio (the so-called "Rembrandts in the Attic" of Messrs. Rivette and Kline). While the pruning of the underbrush that such embryonic efforts provided occasionally led to more strategic programmes, like at Dow or Proctor & Gamble, more often, the limited financial return of such efforts discouraged those companies from moving forward to discover the more significant meaning of patent mining.

That is not to say that on the tactical level, patent mining can't offer useful information for distinguishing patents that could be licensed in non-competing fields of use, abandoned or donated – saving money and providing valuable tax donations. But it is not what should or will motivate a company, competing for internal financial resources, to devote the serious commitment the practice deserves.

Patent mining for the enduring company

Today, patent mining can no longer be limited to a self-reflective study of your own patents. It must mean the active scanning and analysis of ALL patents that can directly affect your business and technology development practice. Patent mining is a strategic and core function for any IP-centric corporation seeking to tie technology development to business strategy and provides a foundation to help managers make strategic decisions regarding IP acquisition and technology development.

Mismanagement of IP can be as lethal to competitive positioning and new product development as poorly drafted patent filings, or worse, picking the wrong technology platform. But if patent mining is more than an operational task for the IP law department, who "owns" it in a typical corporation: legal, the CTO or the CEO? Harry Gwinnell, Chief IP Counsel at Cargill Inc., says: "The greatest likelihood of success lies in

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establishing a business group, visible throughout the company, to identify and execute hidden opportunities." The business group, notes Gwinnell, should contain staff members from "technical, marketing and financial" and will provide "a point person inside the company for capturing IP value".

Mine your own business

We have seen an explosion of software tools and IP search engines that make our forays into this domain much, much easier than our efforts of the late 1980s. Companies once sent researchers to review the patents within a small section or subsection of a portfolio, with an eye on narrow freedom of action. Today, patent management applications and robust search engines allow internal IP managers to quickly pull together organised sets of patents from within their own portfolios, those of specific competitors, and those patents citing relevant technical or industry terms.

With the advent of such patent analysis software, IP managers have pushed the patent mining process toward studying larger and larger patent sets. Companies, once only interested in understanding the patents within their own portfolio, are now interested in knowing about the patents held by competitors. Where patent searches were once aimed at determining prior art during prosecution, they are now aimed at winnowing out patentable new technologies before the research and development teams spring into action.

When mining a large portfolio, software provides the essential first step in organising and triaging. However, even the best software does not take the place of "human analysis", experts with technical and business aptitude and the ability to understand a patent claim. These experts are needed to review the output, confirm which patents are important and WHY. Experts can also refine the initial search to confirm that it captures relevant information and to tweak the categories to ensure accuracy and alignment with business objectives.

Clustering or categorising the information (whether in your portfolio or in those of others) is important. Ideally, you should maintain two parallel organisation structures – one that is generic and categorised by technology and one that is specific to your company's products – thus tracking both what you need and how it fits into the "big picture". By capturing both perspectives, managers are better equipped to make decisions about moving IP inbound and outbound.

With this information in hand, it is necessary to ensure that the right people have access to the mining data and know how to use it to make sound business decisions: having the information visible to the entire company, from R&D, to product marketing, to the highest levels of management, will raise IP-consciousness within the organisation.

With this new found consciousness, more people could be engaged in everything from spotting infringers at a trade show to recognising a complementary technology that could enhance an internal effort. The more you know about your own IP, the better able you are to recognise intersections with the outside world. On its own, IP is just a pointer to the underlying technology that is really needed. Nevertheless, an IP portfolio that is organised by technology area and mapped to the company's products is highly useful in providing the right information.

Exploiting the gold mine

Success in refining the "ore" of promising opportunities that are identified by patent mining can be constrained by limiting executives to a narrow menu of "plain vanilla" licensing deals. IP transfers can provide the basis for donations to not-for-profits to licensing alternate fields of use, all the way to spin-offs – the list is only limited by imagination.

Companies may naively suffer from IBM envy – striving to achieve the multi-billion dollar licensing success of Big Blue. Yet, when you consider that only five out of every 100 patents is licensed and that one out of every 100 patents actually generates revenue, it is apparent that IP mania has skewed the facts and produced a surreal belief that every company with patents can enjoy the success of IBM. It is often difficult for a company to embrace the reality that a patent or technology is not so priceless. Many who suffer from IBM envy would not be willing to confront an infringing player in court under any circumstances.

Limiting commercialisation activity to licensing leftovers, or non-core, patents and technologies is another means to usher in failure. Often, success in licensing and commercialisation activity lies much closer to core. According to Gwinnell: "Most of the major value (in a portfolio) lies in your core technology and it takes hard work and creative thinking to extract that value." IP professionals are obligated to seek new channels of exploitation, welcome risk and bring their creative deal-making skills to life.

Large-scale successes will often involve the sharing of technology that is uncomfortably close to core, or what used to be referred to as the untouchable "crown jewels". The following deals demonstrate that the "Rembrandts" will often reside in your living room, not in your attic:

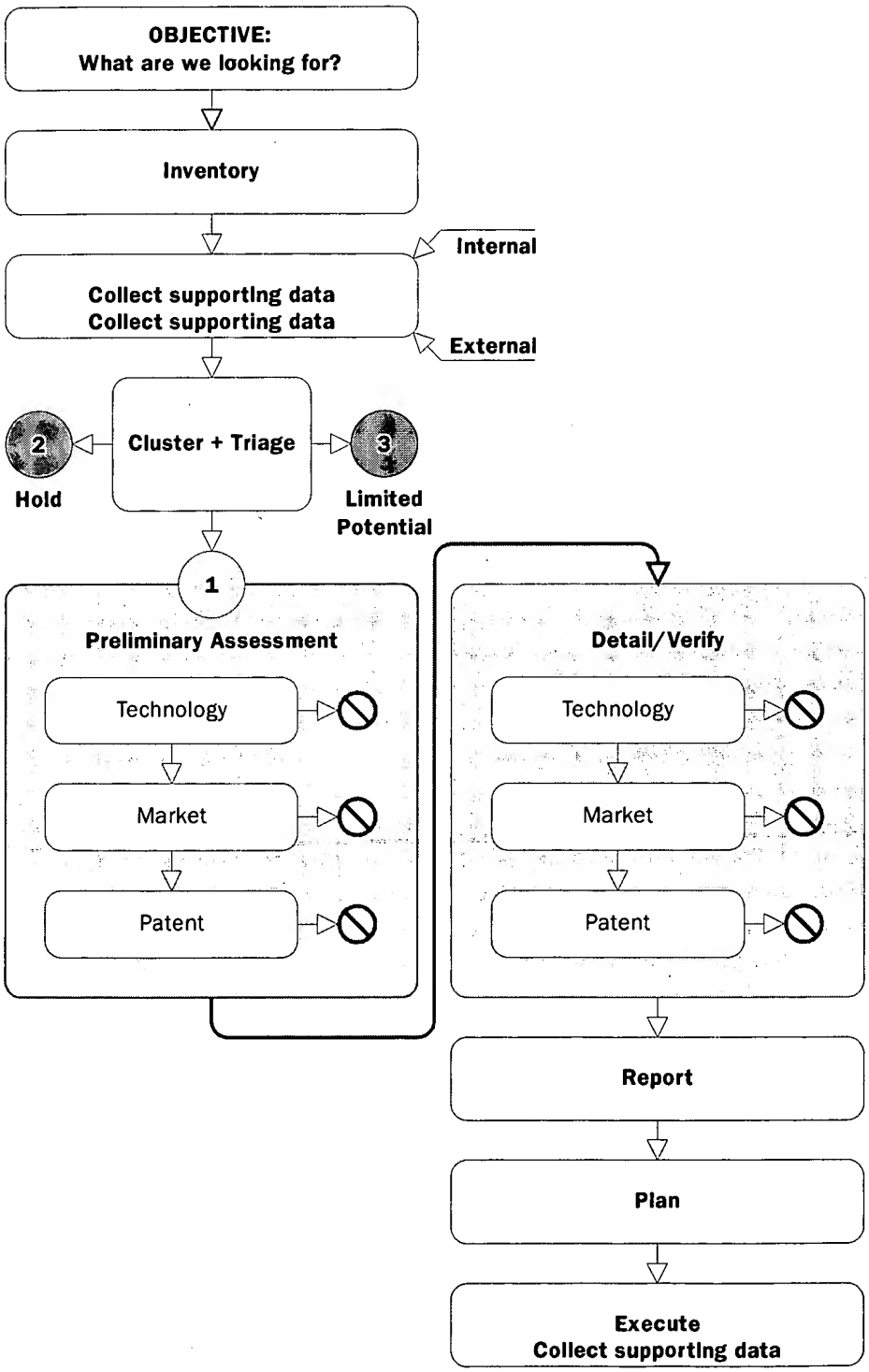
- In 2002, Raytheon entered into a strategic partnership with Surmet Corporation to

Distractions from what's real

The new wave of "IP-mania", as recognized by Karl Jorda, Professor of Intellectual Property Law and Industrial Innovation at the Franklin Pierce Law Center in Concord, New Hampshire, has created a distraction from what's real. As reflected in Les Nouvelles, the Journal of the Licensing Executives Society (June 2003), Jorda notes these new entrants to the marketplace have produced distraction from the real meaning of strategic IP management by generating "a lot of hype and hoopla about producing 'patents on demand' in 'patent factories' and valuing a patent in a 'matter of minutes'" by providing what Jorda calls, "solutions in search of needs".

Only an academic could go first and risk offending the well-meaning, but ill-conceived IP ventures that have sprouted in recent years. Were Professor Jorda only an academic, his evisceration of the recent years of "IP-mania" might be taken with a grain of salt. But in fact, Jorda was the long-time Chief Patent Counsel of Ciba-Geigy. Thus, his experience as both a corporate IP executive and an academic should force all practitioners of IP creation, protection and exploitation to sincerely reflect on his thoughts before practising the truly significant business discipline known as patent mining.

Mining process flowchart



develop its aluminium oxynitride (ALON) technology. ALON was originally developed by Raytheon as an alternative to sapphire and for use in military equipment. However, it was soon learned, with its impact resistance and structural stability over a wide range of temperatures, that ALON could be applicable for commercial development in a wide range of industries, including semiconductor equipment, bio-medical and homeland security. Seeking to generate new revenues from a core technology in unfamiliar commercial fields, while reducing production cost for a material needed in ongoing, internal defence programs, Raytheon licensed the technology to Surmet for development in non-military applications.

- In the late nineties, TRW licensed a set of gallium arsenide (GaAs) patents to RF Micro Devices (RFMD) in exchange for a 37% equity stake in the company. Originally used in satellites by TRW for government customers, RFMD licensed the technology with an intent to develop it for commercial use in its line of wireless headsets. At the time, RFMD was still a privately held company (it went public in 1997), but TRW retained its stake in RFMD until 2000. At the peak of the technology market, TRW sold its stake, netting a considerable profit of nearly $695 million.

I've often been told by many colleagues in the business that "if IP management and patent mining is not about core (business), it's not worth doing". While many IP managers hold this to be true, too few have been empowered by top management to act in a manner that can produce deals like the ones mentioned above. Instead, such deals are done on an ad hoc basis, not inherent as part of an IP management programme.

Panning for gold outside your portfolio

Your own patent mine contains only a small bit of the gold that stands to create strategic advantage for your company. The technology landscape is spotted with patents and technologies that can hold danger and opportunity.

Examining the IP landscape will reveal that the aftermath of the technology bubble collapse has left the technology landscape strewn with patents available for licensing or sale from distressed and bankrupt companies looking for quick cash and willing to sell their technology assets for pennies on the dollar. Licensing or purchasing the rights to these patents and technologies can be valuable in several ways. First, it can help companies bolster IP position and avoid the risk of defending their product position against infringement claims

(particularly to be guarded against is allowing key IP to fall into the hands of "trolls". With no products of their own, these patent-holding companies troll for patents in the IP marketplace with the goal of enforcing the patents against product-holding companies – often at outrageous prices). Second, it can help contribute progress to the development of and reduce the time to market for new products. Finally, it can help maintain competitive advantage as companies develop new product features and improvements in the face of alternative products being brought to market.

Mining your patent portfolio and conducting a technology landscape analysis is the key to knowing exactly what patents you've got, what patents you need, and how much they are worth. The scrutiny of patents has skyrocketed and in the face of a weak economy and heavy belt-tightening, it is important for companies to learn from past mistakes and utilise this new found knowledge to make savvy decisions before buying up more IP than necessary.

An antidote to M&A

Is it possible that in the late 90s, had the large telecom companies only licensed the seminal IP of the emerging upstarts just a scant year earlier than full-scale acquisition, many of the ill-fated mergers and acquisitions that took place could have been avoided? Such hapless bargaining cost shareholders billions of dollars and forced many companies into bankruptcy. Frank Chambers, former Director of Innovation at Eaton Corporation, states that M&A is a "very expensive and very cumbersome" way to acquire technology.

Once again, the wreckage and subsequent fire sales of these massive acquisitions can provide a place to locate and acquire good, long-term IP.

Buy-in from on high

The new era of patent mining involves creativity, assumes a higher degree of risk, and most importantly, requires engagement from upper management. However, the rewards stand to be much higher, beyond licensing fees or royalties.

In order to be successful at extracting value in unconventional ways, and especially if such transactions involve strategic IP platforms, companies will ultimately need executive level support. As Harry Gwinnell notes: "It is difficult to make a significant change within an organisation. The first thing that is often spotted is the additional cost of undertaking this new approach. The only likelihood of success is to propose a programme at the executive level. Only then will people further down the chain be committed to making it work." ■

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Software Tools Chart

Vendor/Tool	Focus	Key Utility
Delphion www.delphion.com	Patent searching	Standard patent searching tool. Contains some robust tools for organising and mining your search results.
MicroPatent/Aureka	Patent clustering and mapping	Provides useful patent landscaping tools but suffers from steep pricing
Metrics Group www.metricsgroup.com	Patent clustering and mapping	Provides reasonably robust clustering and landscape reports at a fraction of the price. Consultants are very amenable and work closely with clients to deliver custom results
M-Cam http://www.m-cam.com/	Patent association	Demonstrates particular strength in locating patents that are "similar" to a given patent. Identifies the strongest patents in any given set.
IP Vision www.tecpatents.com	Patent management support tools	Full range of patent management solutions, including patent to product mapping. Assesses the status of patents and products held by your competitors.
CHI www.chiresearch.com	Patent database with added clustering capability	Patent clustering and market assessment services. Carefully maintained patent databases that stress accurate assessment of patent assignment and ownership.
ClearForest	Information organization	Provides tools that can sift through extremely large datasets, whether internal file information or downloaded patent set information. Companies that take the time to install and learn ClearForest Systems may have an advantage in synthesising large amounts of disparate data (patents, research articles and new articles) to make strategic decisions.

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